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ABSTRACT

Selected articles on various aspects of biology teaching published in 1979 have been annotated in this two-part bibliography. Entries from 19 journals representing 11 different countres are presented according to a topic area classification scheme listed in the table of contents. Countries represented include: Australia; Bulgaria; Czechoslovakia; Federal Republic of Germany; France; German Democratic Republic; Great Britain; Hungary; Poland; Soviet Union; and the United States. The 15 general topic areas include: didactics of biology as a scientific discipline; history of biology; biology instruction abroad; teaching/educational objectives; gnoseological, psychological, and logical foundations of biology teaching; biology curriculum and content; didactical principles in biology teaching; methods used in biology teaching; organizational forms of biology instruction; planning; achievement; biology teachers; and articles and information related to scientific biology. Each entry (numbered according to a code in the table of contents) includes author, original title (and English translation when appropriate), complete journal reference, and English abstract. Entries do not necessarily reflect all the topic and sub-topic areas included in the table of contents. (JN)

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INFORMATION BULLETIN

THE DIDACTICS OF BIOLOGY

SELECTED BIBLIOGRAPHY FOR 1980

PART I

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Biologia i khimia, 23, 1980, Nos.1-6	Bulgarian People's Republic
Biologia w szkole, 33, 1980, Nos.1-5	Polish People's Republic
Biologie - Géologie, 67, 1980, Nos.1-4	France
Biologie in der Schule, 29, 1980, Nos. 1-12	German Democratic Republic
Biologiya v shkole, 54, 1980, Nos.1-6	U.S.S.R.
Der Biologieunterricht, 16, 1980, Nos. 1-4	Federal Republic of Germany
Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, Nos. 1-8	Federal Republic of Germany
Journal of Biological Education, 14, 1980, Nos. 1-4; 13, 1979, Nos. 1-4	Great Britain
Natural Science in Schools, 18, 1980, Nos. 1-3; 17, 1979, Nos. 1-3	Great Britain
Naturwissenschaften im Unterricht-Biologie, 28, 1980, Nos.1-12	Federal Republic of Germany
Praxis der Naturwissenschaften-Biologie, 29, 1980, Nos.1-12	Federal Republic of Germany
Přírodní vědy ve škole, 31, 1980, Nos. 1-10	Czechoslovak Socialist Republic
Science Education, 64, 1980, Nos.1-5	U.S.A.
The American Biology Teacher, 42, 1980, Nos. 1-9; 41, 1979, Nos. 1-9	U.S.A.

The Sciences Teacher, 47, 1980 Nos. 1-9	U.S.A.
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Učební pomůcky ve škole a osvětě, 19, 1979-1980, Nos. 1-10	Czechoslovak Socialist Republic

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Der Biologieunterricht - prepared by Dr. A. Altmann

Der mathematische und naturwissenschaftliche Unterricht - prepared by Dr. A. Altmann

Journal of Biological Education - prepared by Dr. L. Rošická /vol. 14/ and Dr. V. Anděrová /vol. 13/

Natural Science in Schools - prepared by Dr. L. Rošická /vol. 18/ and Dr. V. Anděrová /vol. 17/

Naturwissenschaften im Unterricht-Biologie - prepared by Dr. A. Altmann

Praxis der Naturwissenschaften-Biologie - prepared by Dr. A. Altmann

Přírodní vědy ve škole - prepared by Dr. V. Čížková

Science Education - prepared by Dr. L. Rošická /vol.64/ and Dr. V. Anděrová /vol. 63/

The American Biology Teacher - prepared by Dr. L. Rošická /vol.42/ and Dr. V. Anděrová /vol. 41/

The Science Teacher - prepared by Dr. L. Rošická

The Australian Science Teachers Journal - prepared by Dr. L. Rošická /vol. 26/ and Dr. V. Anděrová /vol. 24, 25/

The School Science Review - prepared by Dr. L. Rošická

Učební pomůcky ve škole a osvětě - prepared by Dr. V. Čížková

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1.6

1. KONIG, H.: Biologiemethodische Forschung - Bilanz und Orientierung. /Research in the didactics of biology - recapitulation and orientation./

Biologie in der Schule, 29, 1980, No.2/3, pp.86-88.

The 6th meeting of didactic workers was convened on 12th-13th December, 1979, in Leipzig, to evaluate the thirty years' long existence of the didactics of biology and to define its objectives for future research. Research results were submitted on approximately 50.000 pages and they included both the content and the process aspects of biology teaching. Attention was also focused on the special didactics of biology. What still remains to be developed more profoundly are questions related to objectives, polytechnology, character build-up and building up of socialist awareness. Doctoral theses made up 70-75% of all research. The author of this article points out to some shortcomings of the theses. In future, it will be especially necessary to deal with questions concerning practice and to put research results into practical life.

1.8

2. Aulis-Förderpreis Biologie. 1980. /Aulis Biology Promotion Prize 1980./

Praxis der Naturwissenschaften, 29, 1980, No.6, pp. 191-192.

The prize for the best article published in the journal Praxis der Naturwissenschaften in the year 1978/79 was awarded to Dr. Kalus Dumpert of the

Zoological institute in Frankfurt, for his article dealing with the acoustic communication of crickets, designed as pupil experiment for secondary grade II. The article was published in the 27th volume /1978/, in 10th issue, pp.253-259.

1.8

3. SCHARP, K.H.: Welchen Beitrag kann eine naturwissenschaftliche Zeitschrift zum Biologieunterricht der gymnasialen Oberstufe leisten ? /What should be the contribution of a natural science journal to the teaching of biology at senior grade of grammar school?/

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 1, p.20.

The introduction of the senior grade at grammar school has created a new situation both with respect to teachers and students. Traditional classroom teaching has been replaced by a system of courses. A new content has been introduced into the teaching of biology and other subjects, too. Teachers and students face the task of processing new subject matter including new developments in scientific biology. They can find help in this respect in a suitable didactic journal. The teaching of biology at the senior grade should be put on a more scientific-oriented basis, for it it designed to serve as preparation for university education.

1.8

4. STAWIŃSKI, W.: Analiza porównawocza rocznika 1978 "Biologii w szkole" z zagranicznami czasopismami przedmiotowymi. /A comparison analysis of the journal Biologia w szkole, year 1978, against didactic journals published abroad./

Biologia w szkole, 33, 1980, No.1, pp.29-33.

The author has carried out a comparison analysis of the Polish didactic journal Biologia w szkole, against similar Soviet. Czechoslovak, German, English and American journals. Altogether, he has made comparisons between six single-subject didactic journals /only biology/ and three multi-subject journals /such as the Czechoslovak journal Přírodní vědy ve škole, comprising biology, geology, chemistry and geography/. The author has made comparisons of the scope of the journals /Biologia w szkole 100%, Journal of Biological Education /Great Britain/ 133%, Praxis der Naturwissenschaften /Federal Republic of Germany/ 150%, Biologie in der Schule /German Democratic Republic/ 225%, The American Biology Teacher 625%. He has also made comparisons of the quality of paper. As regards the journal published in the Federal Republic of Germany, each issue carries brief abstracts of the articles, the American journal attaches a small photograph of the authors of an article, mentions where they work and what is their specialization, the Czechoslovak journal Přírodní vědy ve škole prints the titles of articles in three languages /Czech or Slovak, Russian and German/. The author has also analyzed individual types of articles /specialized, didactic, articles designed for teachers' further education, articles dealing with the updating of teaching, questions of growing and breeding activities carried out at schools, synopses of teaching lessons, theoretical articles concerning the didactics of biology, bibliographical information, discussion with editors, the journals published in the capitalist countries also carry promotional information. In conclusion of his article, the author discusses the function of a didactic journal.

1.8

5. Wyniki konkurzu "projektujemy środki dydaktyczne do nauczenia biologii z higiena w powszechnej szkole średniej". /Results of the competition "Planning didactic aids for the teaching of biology focused on hygiene at comprehensive secondary school"./ Biologia w szkole, 33, 1980, No.2, pp.88-89.

The jury of the competition declared by the journal Biologia w szkole /2nd issue, vol. 32, 1979/ met on 5th December 1979 with the representatives of the Teachers' Education Institute, School Curriculum Institute, with the representatives of the Centre for the Development of Scientific and School Facilities, to evaluate the results of papers entered in the competition and to award the prizes. The main prize /2.000 złoty/ was awarded to the paper by M. Piotriwicz-Golug J., dealing with phasograms /the article was published in Biologia w szkole, 33, 1980, No. 2, pp.89-91/, the prize of 1.500 złoty was awarded to J. Majkowska for her paper entitled Aids for Teaching Hygiene, three prizes of 1.000 złoty each were awarded to C. Mrowca for his paper on pupae, F. Walicka for his paper on insulin and adrenalin secretion and W. Warakomski for his paper on plant flowers.

1.8

6. Zur Praxis des Biologieunterrichts in den achtziger Jahren. /Concerning the practice of teaching biology in the 1980's./

Praxis der Naturwissenschaften-Biologie, 29, 1980,
No.1, pp.1-3.
4 photographs.

The journal Praxis der Naturwissenschaften-Biologie enters its 29th year of existence. Some changes in its objectives and organization are to be implemented. In the future, it will focus on the didactic journal designed for grammar school IInd grade and it will be especially designed to aid teachers in their work. Contributions will be printed as framework subjects, which will make it easier for teachers to study and utilize the journal. Priority will be given to practical contributions. The management of the journal has been entrusted to a team of editors, each of whose members will be responsible for three issues of the journal. They will publish articles informing on new developments in biology. Literature still lacks information on problems to be solved at matriculation examinations. The team of authors comprises Prof. Klaus Dylla, Dr. Karl-Heinz Scharf, Manfred Schuster and Dr. Gerhard Trommer.

2.24

7. ROSENTHAL, D. B.: Using Species of Drosophila to Teach Evolution.

The American Biology Teacher, 41, 1979, No.9, pp. 552-553.
6 figs.

Evolution represents a long-term process; for that reason, its demonstration within laboratory exercises is very difficult. The main objectives of laboratory teaching of evolution are the phylogenetic-taxonomic, ecological, paleontological approaches and the simulation of the natural selection. In her article, the authoress submits a survey of these categories and describes an additional fifth, species approach. She also describes in her article laboratory exercises using species of the fruit fly of the Drosophila genus. In the preparatory phase, students prepare, cultivate and describe the species used. They also try to develop a key to classify fruit flies. Later, they experiment with crossbreeding and the competitive demands of different species. The students' response to the above project was remarkable. The students learned the principle of diversity, reproductive isolation, definition of the species, adaptability and the fact that evolution takes place in a gradual manner.

3.1

8. AMIDEI, R.: Science education in the New China.

The Science Teacher, 47, 1980, No.1, pp.16-21.
1o figs.

A delegation of American natural science teachers visited the People's Republic of China in 1979. During their visit, they saw teaching at schools of all levels. They were especially interested in the teaching of biology, chemistry and physics. They visited school laboratories and got acquainted with school curricula. A member of the delegation sums up her experiences in an interesting article supplemented with several authentic photographs.

3.1
9. CICHY, D.: Z badań nad wdrożeniem programu nauczania biologii w klasie IV. /On a survey dealing with the experimental teaching according to the biological curriculum in the 4th grade./

Biologia w szkole, 33, 1980, No.4, pp.217-222.
7 tables.

A comprehensive survey of the experimental teaching of biology and hygiene in the 4th grade of comprehensive secondary school was conducted in the school year 1978-1979 It was carried out by the research workers of the School Curriculum Institute at 19 schools in six Polish provinces, in the environment of a big city, a small town and a village. The research workers of the Didactics of Biology Institute in Cracow took also part in the survey, as well as the research workers of the Mathematical and Natural Science Subjects Institute and the research workers of the School Curriculum Institute in Warsaw. The survey was designed to investigate the teaching of 22 teachers, mostly with nine to twelve years' school practical experience. All experimental schools had biological laboratories, 17 schools had their school garden plot, there were libraries available at all schools, including didactic and specialized literature. The survey aimed at the theoretical and empirical verification of the new curriculum of biology and hygiene in the 4th grade, the theoretical analysis of the curriculum, pedagogical observations; it was carried out in the form of an unorthodox experiment /without control classes/, it was combined with measurements of pupils' knowledge by using statistical methods. It was designed to test the methods and forms of implementation of the new curriculum. Tests were used to evaluate pupils' knowledge. The author of this article reports on the results of the survey; best results were achieved in the big city.

3.1

10. GRONKE, O. - KUMMER, G.: Interpretation des Lehrplanes Biologie Abiturstufe in den Nachfolgematerialien. /Interpretation of the biological curriculum at grammar school in the follow-up material./

Biologie in der Schule, 29, 1980, No. 7/8, pp.325-328.

The school policy of the German Democratic Republic is focused both on the content modification and on the perfection of the system of education. The revised biological curriculum and material which is to follow /textbooks, methodological handbooks/ will play an important role in the life of the grammar school. The objective of the changes is to raise the quality of pedagogical work, to highlight educational objectives from a new angle, to modify the content to a certain extent. The authors further characterize requirements with respect to the revision of the biological curriculum /unfavourable proportion in the relationship subject matter-time, theoretical over-rating of some facts, inadequate links with practice/ and explain the concept of the biology textbook for the 11th grade of grammar school and methodological guides. In conclusion, the authors submit several remarks on preparation for teaching according to the new curriculum.

3.1

11. HOCKE, CH.: Zur Einführung überarbeiteter Lehrpläne im Fach Biologie der Abiturstufe. /On the introduction of the revised biological curriculum at grammar school./

Biologie in der Schule, 29, 1980, No.7/8, pp.315-324. 5 tables.

The new biological curriculum will be introduced at grammar school on 1st September, 1980. The author of this article characterizes first the objectives to be met by the revised curriculum, i.e. to raise the standards of knowledge and skills and to increase their applicability, to reach a higher level of pupils' independence and activity and, finally, to combine the teaching of biology with life and practice, including an intensified application of educational aspects. The author also characterizes the initial approach which has led to the revision of the curriculum /respecting the relationship objective - subject matter - time, combination of theoretical knowledge with practice, making use of knowledge acquired in preceding biology classes/. In conclusion, the author specifies changes that have been made in some topic ranges /Classification system, Ecology, Physiology, Genetics/ and she presents guidelines for methodologists.

3.1
12. HORNÍK, F.: Návrh nových osnov biologie v SSSR.
/Draft biological curriculum in the USSR./
Přírodní vědy ve škole, 31, 1979/80, No.3, pp. 95-96.

The author reports on the main ranges of topics comprising the draft curriculum for 5th-10th grades of Soviet comprehensive schools. In all grades, biology is taught two lessons per week, which amounts to 70 lessons per school year.

3.1
13. KORMONDY, E.J.: Environmental awareness and education in Hungary and Poland.
The American Biology Teacher, 41, 1979, No.6, pp. 363-367.
3 figs.

The author of this article sums up what he has learned about the standards of environmental awareness and education in Hungary and Poland during his visit in the two countries. He reports first on the school system and the methods of its organization. He especially deals with the integration of environmental teaching into the curriculum. In Hungary, this topic is part of a number of subjects, such as biology or geography. A great emphasis is laid on practical exercises, preferrably in the field. The author describes in greater detail teaching in town schools he himself visited. He also mentions the possibilities of study in this discipline at universitites and discusses the main effects influencing environmental study. In a similar manner, he deals with problems related to environmental education in Poland.

3.1

14. MOCHOWA, I.: Propozycja rozkładu materiału do nauczania higieny. /A suggestion how to process material designed for teching hygiene./ Biologia w szkole, 33, 1980, No.2, pp.101-106.

The author presents her ideas and considerations concerning curriculum development for the teaching of hygiene. She focuses her attention on the specialization of biology-chemistry at school. She submits a draft of lessons, teaching methods, teaching aids, especially films, based on her personal experience with school teaching. The draft deals with the teaching of hygiene in two variants, i.e. combination of biology-chemistry /one lesson per week for two years/ and a variant without biology /one lesson per week in the first grade/. She discusses the objectives and tasks of the teaching of hygiene, history and prospects of the teaching, characteristics of the subject, methods and forms of teaching. The author suggests how to deal with the subject matter of hygiene in the third grade of grammar school, presents information on literature, how to deal with individual topics. The combination of biology-chemistry should comprise altogether 30 lessons per year in the third grade and 25 lessons per year in the 4th grade of grammar school. The author further reports on films, sketches, cuttings from literature and journals, slides, foiliograms, textbooks, radio and television programmes, literature for young people and specialized literature.

3.1

15. NIKOLOV, T.K.: Sdrshaniye na obucheniyeto po biologiyi v deseti klas na yedinoto sredno politechnichesko uchilishche-segashno stoyaniye i tendentsiyi. /The content of biology subject matter in the 10th grade of the unified secondary polytechnical school - present state and trends./

Biologiya i khimiya, 23, 1980, No.3, pp.16-24.

The author criticizes the existing biology curriculum which does not represent adequately its new disciplines, such as general biology, molecular biology, genetics. The new biology curriculum should put this problem right and it should also respect on a much larger scale the potential of interdisciplinary relations with respect to chemistry and physics. A serious attention should also be paid to pupil instruction on man in relation to his environment.

3.1

16. PODSTOLSKA, M.: *Uwagi o realizacji programu dla klasy IV.* /Reflections on curriculum implementation for the fourth grade./

Biologia w szkole, 11, 1980, No.5, pp.276-281.
4 figs.

The author presents the results of a survey of the curriculum designed for the 4th grade of comprehensive education school. Twenty-two teachers participated in the survey; the author of this article interviewed three of them. They evaluated the curriculum designed for the 4th grade of comprehensive education school, the problems encountered by the teachers during the experimental testing of the curriculum; they were asked whether the teaching content according to the new curriculum was interesting for pupils, they evaluated the modifications implemented in the curriculum and submitted some new suggestions; the teachers were also asked what methods had been used in the experiment, what didactic literature had been used by the teachers during the experiment, whether schools were adequately equipped for the experiment, what was the teachers' opinion of the new textbook designed for the 4th grade and whether they had any comments on the new curriculum. The teachers stated that some topics were better suited for higher grades, such as reproduction and man's development; they had problems with teaching the topic "Water Biocenoses", they pointed out to the lack of some teaching aids at schools and to the fact that pupils were interested in the subject matter, however, some ecological concepts were too difficult for them, they were not able to use them in practice; the teachers also suggested to omit some passages dealing with the protection and development of environment, such as the passage concerning the recycling and rational uses of natural resources; the teachers also mentioned the application of activizing teaching methods, they stated that there was sufficient didactic literature available, teaching aids were also available, yet not always those that were actually needed; the teachers positively evaluated the new extbook and they also mostly positively evaluated the new curriculum designed for the 4th grade.

3.1
17. Program powszechnej szkoły średniej. Biologia z higiena. /Secondary comprehensive education school. Biology and hygiene./

Biologia w szkole, 33, 1980, No.4, pp.195-197.

A new biology curriculum for teaching biology in the 4th grade of secondary comprehensive education school will be introduced in the school year 1981-1982. On experimental testing in schools, the curriculum was approved by the ministry of school education. A large team of biologists and biology didactic workers participated in the curriculum development. The curriculum comprises two lessons of biology including hygiene in the fourth grade. The curriculum prescribes the following topics: Biology as a science and a subject of teaching, objectives, tasks and methods of biology teaching; Environment, dryland and water. Examples of ecosystems. Environment of dryland, typical communities of plants and animals in a specific biocenosis; Hygiene and health of man - man as a dryland organism, human nutrition, maturation, multiplication of plants, animals and man, infectious diseases as factor preventing the correct functioning of organisms, organization of work and rest; Water environment, characteristics of water communities of plants and animals; Sea as a water environment; Difference between dryland and water as living environments; Protection and development of environment; Man's dependence on natural environment; Changes in nature generated by man. A guide to the curriculum defines what skills should be built up in the fourth grade, such as methods and technique of learning biology, work with textbook and auxiliary literature, with magnifying glass, planning, implementation and assessment of observations and experiments, graphical representation of results of observation and experiments, comparisons of objects and processes, learning correlations between structure and function, learning essential hygienic habits, planning work, execution of simple operations to protect and create environment, and the like.

3.1
18. Programmy fakuĺtativnikh kursov po biologii. /Curricula of optional biological subjects./

Biologiya v shkole, 54, 1980, No.4, pp.47-57.

The article analyzes in detail the curricula of five optional subjects; each of them comprises 35 lessons:

7th grade - Introduction to Ecology /introduction -

7 lessons, water biogeocenoses - 8 lessons, dryland biogeocenoses - 15 lessons, environmental protection - 5 lessons/

8th grade - Man's Physiology /organism as a whole and its organs - 4 lessons, cell and tissues - 5 lessons, inner environment - 7 lessons, functions and diseases of the heart - 4 lessons, breathing - 3 lessons, digestion and metabolism - 8 lessons, excretion - 2 lessons, regulation - 2 lessons/

9th grade -Physiology of Higher Nervous Activity /introduction - 4 lessons, nervous tissue - 8 lessons, structure and function of the nervous system - 6 lessons, reflexes - 8 lessons, tail train - 8 lessons, conclusion/

10th grade - Psychology /development - 2 lessons, percepts, sensations, concepts - 6 lessons, memory, thinking, speech - 8 lessons, will, attention, consciousness - 8 lessons, emotions - 3 lessons, personality - 6 lessons/

11th grade - Genetics /introduction - 1 lesson, gene - 6 lessons, ontogeny, hereditary signs - 6 lessons, chromosomes - 6 lessons, chemical structure of gene - 3 lessons genetic regulation of protein synthesis - 6 lessons, genetics and medicine - 3 lessons/.

3.1

19. STAWIŃSKI, W.: O lepsze przygotowanie nauczycieli do realizacji założeń w powszechnej szkole średniej. /On teachers' better preparation for the implementation of the objectives of general secondary school./

Biologia w szkole, 33, 1980, No.3, pp.141-145.

The author reports on the state of the school reform in Poland. The new curriculum is introduced as early as the 4th grade by the subject Social and Natural Environment, which also includes biological topics. Biology itself is being experimentally tested in fourth to sixth grades of secondary school. The new tasks set up in the teaching of biology and the new reforms of the system of teaching and education will, naturally, also require substantial changes in teachers' training at universities and colleges. Changes are being implemented in curricula. The study of biology will be extended to four and five years. There are not only changes occurring in the biology curriculum, but also the biology of didactics curriculum will be perfected at universities and colleges. Teachers' training will comprise exercises in molecular biology, biochemistry, cytology, physiology of plants and animals, ecology, etc. Teachers will be trained to cope better with practical exercises at school, they will get acquainted with the essentials of laboratory technology, breeding and growing, with technical teaching aids, with work in the field. Pedagogical practical experience of students will also be perfected, it will be extended from six weeks to five up to six months. The author also reports on doctoral theses. As regards school practice teachers should be able to provide instruction both from the organizational and material point of view, they should see to the establishing of a biological laboratory and school garden plot, find opportunities for group work, modern methods of teaching and they should also raise the standards of prescribed laboratory exercises.

3.1

20. STAWIŃSKI, W. - ZYBALSKA, E.: Założenia i cele zweryfikowanego programu biologii w klasie IV.
/Prerequisites and objectives of verified biology curriculum for the fourth grade./

Biologia w szkole, 33, 1980, No.4, pp.198-202.
3 tables.

The biology and hygiene curriculum for the fourth grade of comprehensive secondary school is of a transitory nature between the biological subject matter of the first to third grades in the subject Social and Natural Environment and the systematic teaching of biology in the fifth to tenth grades. The teacher's task is to direct pupils towards awareness of the dependence between man and environment, to teach pupils to learn rationally and to gratify the pupil's needs with respect to his or her mental and physical development. The author further deals with the classification of objectives which he categorizes into superior /specified by developed society/, task-oriented /objectives specified for a specific subject/ and stage objectives /specified for individual school years/. The objectives lay emphasis on acquisition of knowledge, skills and habits and the building up of specific stands and convictions. As regards instruction, it should develop pupils' thinking, they should learn to graphically represent the results of observations and experiments, to conduct independent observations and experiments and to learn to interpret them, to get acquainted with the principles of protection and creation of environment and to make a rational use

of natural resources, to learn self-control and assessment of one's own work. The author includes tables presenting the verified classification of the stage objectives of the biology and hygiene curriculum for the fourth grade, correlation between the stage objectives of instruction in the fourth grade and the objectives set up in the curricula of other grades, relationships between stage, task-oriented and operational objectives /objectives concerning the implementation of the curriculum content and selection of teaching methods/.
As regards the implementation of the curriculum designed for the fourth grade, it is necessary to provide the growing of specific plants and the breeding of specific animals, to provide a school garden plot, a biological laboratory, to carry out field work, to select and assign objectives for individual lessons, to provide teaching methods combining the teaching and educational process with scientific work in biology. It is necessary to raise the standards of equipment with teaching aids.

3.1
21. SWIT, A. - SAKŁAWSKA, I.: *Zajecia fakultatywne w grupie biologiczno-chemicznej.* /Optional work in the biological-chemical group./

Biologia w szkole, 33, 1980, No.5, pp.291-293.

The curriculum of optional work in the biological - chemical group consists of A, B, C sections organized together and of D, E, F sections selected by the teacher himself or herself according to pupils' interest. Group A deals with life at molecular level, selected questions concerning chemistry, biochemistry and cell biology supplemented with suitable visits of industrial plants, for example, the authors describe their own experience with a visit of a plant making yeast and vinegar. Microscope is used in getting acquainted with cell biology; for that reason, the authors not only instructed the pupils on common microscopical equipment, but also included a visit to an institution using an electron microscope.

Groups B and C deal with homeostasis , regulating mechanisms. These topics are demanding with respect to the teacher's preparation. Group D deals with ecological elements, active protection of environment; trips are organized, exercises, work of biological nature, literature is read concerning ecological problems. Pupils most often choose groups E, F dealing with the importance of chemistry for agriculture, mineral fertilizers, herbicides, characteristics and compositions of medicines, uses of antibiotics, uses of chemistry in medicine, zoological engineering and veterinary medicine. On the basis of their own experience, the authors describe the teaching aids used, as well as teaching methods, organizational forms of teaching /seminars, laboratory work, group instruction/. Optional work of described nature is very demanding with respect to the teacher, it requires a perfect knowledge of specialized and didactic literature, acquaintance with curricula designed for lower school levels, for the teacher should make a full use of the previously acquired knowledge nad skills of pupils. This work is successful if it complies with the biology and chemistry curriculum and if interdisciplinary relations are respected.

3.1
22. ZVEREV, I.D. - MYAGKOVA, A.M.: *Vazhnyy etap v povyshenii effektivnosti biologicheskogo obrazovaniya.*
/A significant step towards increasing the effectiveness of biological education./

Biologia v shkole, 54, 1980, No.6, pp.24-33.

A perfected alternative of the biology curriculum was approved on 1st July, 1980; it will come into effect in the school year 1981/82. The article characterizes the changes taking place; interdisciplinary links in biology will be strengthened, the structural arrangement and methodological apparatus of the curriculum will be perfected, intellectual and manual skills to be acquired by pupils have been specified, duplicity has been removed, part of the subject matter is designed for pupil home reading, some difficult questions of secondary importance and some laboratory exercises have been removed, but, on the other hand, several generalizing, integrating topics have been included concerning evolution, ecology, etc. The article also presents a table indicating the changes occurring in individual topics.

3.2
23. BARLETT, V.L.- OGILVIE, D.: *Participatory decision-taking among science co-ordinators and teachers.*

The Australian Science Teachers Journal, 24, 1978, No. 2, pp.19-26.
3 figs.

The authors deal with the problem of participation in decision-making with respect to curriculum at Australian schools. They focused their attention on the field of natural science. They carried out a survey at secondary schools in Queensland aimed at finding whether science co-ordinators investigated the possibilities of participation in decision-making at their particular school. In addition to science co-ordinators, the survey also included science teachers. The survey used questionnaires. The curriculum was defined by means of four elements - planning, proposing, implementing and assessment. The results of the survey were summarized by the authors on diagrams presenting all 43 points of the questionnaire. The authors dealt in detail with the relationship existing between decision-making levels concerned with the curriculum. Most persons questioned preferred consultation with higher institutions. Student influence was mostly not considered. In conclusion of their article, the authors sum up structures proposed for decision-making and compare criteria applied to decision-making.

3.2

24. BAR-TAL, D. -LEINHARDT, G. - BAR-TAL, Y.: Effects of an innovative science program on perceptions of locus of control and satisfaction.

Science Education, 62, 1978, No.3, pp.349-357.
1 table.

The article describes a study designed to investigate the reinforcement of an individualized science programme /ITP/ with specific objectives and how students perceive the locus of control and satisfaction. Intellectual skills questionnaire /DIS/ was used in the survey, developed by Grandall, and some specific aids; in the following stage individual interviews were used. The authors of the article present the selection of investigated pupils and describe in detail individual questionnaires, questions and topics of interviews. The results were tested by a t-test and summed up in a table.

3.2
25. BAYLISS, N. - WATTS, D.W.: The Australian Academy of Science School Chemistry Project.

The Australian Science Teachers Journal, 26, 1980, No.1, pp.23-24.

A special committee dealing with school chemistry instruction, set up by the Australian Academy of Science, has developed an extensive project of the above instruction. The authors of the article comment on it in detail, analyzing its individual sections as viewed by students. They comment on all stages of instruction and welcome the fact that more attention is going to be paid to laboratory exercises as part of biology teaching. They also point out, however, to a certain gap between the teaching of chemistry and biology. They analyze biology instruction also from the viewpoint of the society, even from the aesthetic point of view, with respect to chemical production of the practical needs of everyday life. They submit both the scientific and the specific objectives of the Australian Academy of Science project and stress that the chemistry project as developed by the

Academy will have to be first subjected to experimental teaching throughout Australia.

3.2
26 BILLINGS - CUPHONE - NOBER: Lighting up sciences for the visually impaired.
The Science Teacher, 47, 1980, No.3, pp.28-30.
4 figs.

The authors, specialists in the field of instruction of visually impaired children, present in their article some methods used by them in science teaching. The four examples they present are only a fraction of assistance laid down in United States laws and concerning the education of visually impaired children and youth.

3.2
27. BLOSSER, P.: An alternative to the M.A.T. program.
Science Education, 62, 1978, No.3, pp.309-317.
1 table.

The author describes in his article a programme designed as an alternative for training individuals who have already achieved some graduate degree in a science or mathematics field with the aim of becoming secondary school teachers. The programme should serve two groups: those who are interested only in getting the diploma and those who in addition would like to achieve a degree in the field of pedagogy. The author discusses the existing experience acquired with the programme so far; it has been attended by 42 students for three years. The author further describes in detail the overall organization of the programme and the contents of individual terms. In conclusion the author compares the programme with the M.A.T. programme, mentions research conducted in connection with the introduction of the new programme and considers its further development.

3.2.

28. BLUM, A. - SILBERSTEIN, M.: Trends in biological education in Israel.

Journal of Biological Education, 13, 1979, No.1, pp. 41-51.
3 figs.

The development of biological education in Israel in the course of the last fifteen years may be characterized by two successive phases of innovation: the former involved transition from descriptive to enquiry teaching of principal ideas and to structured curriculum. The latter phase, stemming from the former, constituted a transition to modular approach with stronger emphasis laid on the relationship between the subject to be studied, students and the society. These trends may be observed in schools of all types. The authors of the article describe in detail the most important reforms of the curriculum, supplemented with specific examples. They also describe the stages of integration development in teaching aimed at achieving an interconnection between the four basic components - the teaching subject itself, the teacher, the pupil and the society as a whole.

3.2
29. CALLERY - KORITZ - ZIPF: Microbiology in introductory biology.

The American Biology Teacher, 42, 1980, No.7, pp.416-421.
3 figs.

The authors criticize the textbooks and handbooks introducing students to biology for their inadequate microbiological introduction, especially the technique of microbiological observation which, in order to be successful, must be subjected to a number of preliminary operations, such as sterilization, substrate dilution, sample preparation. It should then be followed by the technique of observation, measurement, drawing, sketching, staining, etc. Fundamental is the precise controlling of the microscope, the knowledge and the correct use of the lens and, in some cases, of microphoto equipment.

3.2
30. CARRAS, J.N. - JENNINGS, P.J.: Physical science enrolment patterns in Western Australia.

The Australian Science Teachers Journal, 25, 1979, No. 37-42.
3 figs.

The authors deal with the problem of diminishing student interest in physical sciences. They submit data from Western Australia concerning the proportion between the numbers of pupils applying for physical science study and enrolment patterns. Whereas the physics curriculum in this field has practically not changed during the last twenty years, basic reorganization in the chemistry curriculum took place at the end of the 1960's. The biology curriculum was revised at the turn of the 1960's and 1970's. New study disciplines have been established recently - applied technology and biology of man. Anderson investigated the actual numbers of students who have chosen physical science in Western Australia. His results were used by the authors of this article in a specialized survey, however, they covered the whole period of the last twenty years. Thus they have obtained a general picture not only of the present-day situation, but also the long-term trends concerning student enrolment in physical science courses. Similar investigations have been carried out in some colleges, covering the period from 1915. They have focused their attention on the proportion of graduates who have obtained degrees due to their specialization in physical science.

3.2

31. COWEN, D.: *Curriculum decision-making in science teaching in Australia.*

The Australian Science Teachers Journal, 24, 1978, No.2, pp.5-17.
12 tables.

A new science teaching project was developed in Australia at the end of the 1960's. It was made possible for schools to develop their own curricula. In his article the author describes in detail both the project and the response to it and its results. A survey was conducted by Macquarie University specialists in cooperation with teachers and representatives of various institutions. The survey involved 101 schools. The teachers and educational centre workers received a questionnaire developed in three forms /for teachers, educational workers and school headmasters/. The results were processed and summed up in tables. Three key questions were investigated: What changes in the curriculum took place, who participated in their implementation and what factors affected the execution of these changes. The author of this article analyses in detail individual questions, separately from the viewpoints of teachers, educational workers and school headmasters. Final conclusions are then summed up into eight points.

3.2

32. COOPERMANN, S.: Biology for the visually impaired student.

The American Biology Teacher, 42, 1980, No.5, pp.293-294 and 304.

A difficult problem in the instruction of visually impaired students arises in connection with finding suitable methods of demonstrating material which can usually only be demonstrated visually. The method described in the article makes use of the other senses, such as feeling, smelling and hearing during instruction. There exist some other aids, such as cassette recordings, block letter print, relief sketches and simulated models.

3.2
33. DAVIS, E.: *National initiatives in core curriculum.*

The Australian Science Teachers Journal, 25, 1979, No.2, pp.61-65.

The author deals with the problem of core curriculum in Australia, as seen on a national scale. This is a type of curriculum which takes into account individual differences and local conditions, while it still offers general education foundations to all students. Out of the main aspects affecting the development of core curriculum, the author discusses the viewpoint of man's positive development and social and cultural correlations. An important role is also played by the mutual relationships existing between the content, method and conditions pertaining to a specific school instruction. On the basis of the survey conducted in 1978, various content spheres of the core curriculum were defined, such as A Survey of the Influence of Natural Science and Technology on Society and the Individual; Introduction to Australian Political, Social, Economic, Legal and Religious Institutions; Essentials of Australian Cultural Heritage; etc. In addition, the curriculum lays emphasis on the acquisition of basic skills /reading, arithmetic/. In conclusion, the author sums up some recommendations aimed at teachers.

3.2
34. DE CARCER, I.A. - GABEL, P.L. - STAVER, J.R.: *Implications of Piagetian Research for high school science teaching.*

Science Education, 62, 1978, No.4, pp.571-583.

The objective of this article is to investigate research into natural science education related to the development of formal thinking in adolescents according to Piaget´s theory. In its introductory part, the article presents a brief summary of research into the implications of Piaget´s developmental theory with respect to science teaching. The authors further compare some works dealing with the problem, such as works by Karplus and Karplus /1972/, Schwebel /1972/ and Kolodyi /1975/. A considerable attention is focused on research designed to investigate problems related to training, categorized by the authors into three groups according to the purpose of such training: 1. Training in Piagetian tasks; 2. Training in mental operations of formal level; 3. Training in formal thinking.

3.2

35. De VIEDMA, M.C.: *The teaching of ecology in Spain.* Journal of Biological Education, 13, 1979, No.1, pp. 67-68.

The author presents a brief summary of the existing state of ecology teaching in Spain. Up to 1973, biology was divided into three parts - general biology, zoology and botany. Ecology was taught as part of all the three subjects for five years. A reform divided this period into two stages - a three-year period focused on essentials and a two-year period enabling a certain degree of specialization. Further reforms then led to a much freer setting up of specializations differing according to university type from one to five and bearing different names. Ecology as an independent specialization only exists at Madrid University. Although a special seminar was devoted to the problem of ecology teaching in 1977, the situation still remains unsatisfactory. To achieve improvement, support should be given to much more flexible relations both between individual Spanish universities and foreign ones.

3.2

36. DRUGER, M. - SPECTOR, B.S.: Implementation of a college biology course in high school.

The American Biology Teacher, 41, 1979, No.7, pp. 413-415.

A problem of senior high school pupils is usually adequate motivation to learn and to find interesting topics. The authors of this article describe a method used to overcome such difficulties - by introducing a college biology course into high school. The authors have tried this method at five schools in New York. The college biology course is two-term, it is mostly based on audiovisual teaching methods, including individualized study. Collective explanation is conducted once a week and is presented by a senior lecturer. The authors mention the principal topics of the course and the methods of student assessment. The teachers participating in the high school course have been selected according to specific criteria and subjected to a week's training. The course has met with a considerable response both on the students' and teachers' parts and it has been extended to other schools.

3.2

37. ESSER, H.: Zur Theoriebildung im biologisch-orientierten Sachunterricht. /On theoretical education in biology-oriented subject teaching./

Der Biologieunterricht, 16, 1980, No.2, pp.16-25.
2 worksheets.

The author deals with biology-oriented subject teaching at primary grade of basic school in individual states of the Federal Republic of Germany. He presents the objectives of this type of teaching underlying the approach to organizing pupil work, methods of teaching, etc. He stresses that it is only subject-oriented teaching based on independent work of the pupil with original objects, observation, experimentation that may lead to the laying down of quality knowledge foundations for subsequent specialized teaching. In developing theory in teaching, he outlines individual steps to be applied to a varying extent in individual classes of the primary grade of basic school. These are the following: perception and observation of objects leading to non-verbal experiences, naming of objects and processes leading to verbal denomination and to signs, defining by words and signs leading to other words and signs and to concepts, combination of concepts with descriptions leading to the verbal fixation of experience and to immediate protocolar statements, induction leading from particular to more general conclusions and to development of hypotheses explainining individual processes as parts of a higher-order regularity, deduction leading to derivation of further data and to statement on a not-yet-observed fact, experimenting leading to hypothesis verification, their falsification or verification, hypothesis proof leading to the development of a theory of the same construction as the verified hypothesis and the development of a theory leading to the explanation of other processes. Perception of objects and processes takes place as early as pre-school period, they start to be named in the first class, there are attempts at concept development in the second class, there are attempts to combine concepts, to make protocolar statements in the third and fourth classes, logical processes of induction and deduction are used in the fourth class as well as attempts at and elimination of mistakes in developing a theory, in verifying a theory. The more data pupils obtain through observation, comparison and experimentation, the easier it is for them to learn laws and generalizations. An advantage of subject-oriented teaching is the combination of knowledge accumulated by different sciences.

3.2
38. FLYNN, T.D.: The science teaching project.
The Australian Science Teachers Journal, 24, 1978,
No.2, pp.73-78.
2 tables.

The author deals in his article with the activities of the Centre for Curriculum Development coordinating the science teaching project in individual states and regions. Within this coordination twenty-eight modules have been developed designed to assist science teachers in drawing up and conducting courses. The introductory part of the article presents a summary of the basic principles of the project which was originally designed as the continuation of the Australian Science Education Project /ASEP/. The project was finalised at the conference of the Centre for Curriculum Development in the year 1978. At the time when the article went into print the project was in the stage of preparation for publishing. Although the project is based on ASEP, its application will be much broader. It is based on the assumption that teachers increasingly make decisions on curriculum and its objective is to help them with respect to the final selection of methods and resources. On the other hand, however, the project is only a guideline suggesting how to arrive at a decision without trying to influence it.

3.2
39. FRASER, B.J.: Australian Science Education Project: Overview of evaluation studies.

Science Education, 62, 1978, No.3, pp.417-426.
1 table.

In the years 1969 - 1974 the Australian Science Education Project developed material suitable for science courses in lower grades of secondary school in all Australian states. The material comprises 41 units designed for individual students and audio-visual aids designed for groups. The objective of the article is to present an overview of many evaluation studies related to the Australian Science Education Project material. These are altogether six surveys related to curriculum development for the Australian Science Education Project, assessment of the project philosophy, content analysis of the material, environmental teaching, students' opinions and project expansion. Two viewpoints are stressed in conclusion - one is directed at educators, the other is focused on curriculum and project expansion.

3.2
40. GELMAN, D.B. - FELDHUN, S.B.: A-T biology at the high school level.

The American Biology Teacher, 41, 1979, No.8, pp. 487-490.
4 figs.

The authors present their experience with the programme of audiovisual "auto-tutorial" /A-T/ teaching of biology at the high school level, as developed by the authors themselves. The programme makes it possible for pupils to make decisions on their own not only on the learning method, but also the subject of study and the time to be devoted to it. The authors describe the preparatory stage and the development of the whole programme. It is based on 42 biological teaching units and the best possible versatile equipment of the classroom by audiovisual aids. Activity in teaching is mostly required from the students, the teacher only coordinates behaviour and helps in problem situations. The students work either independently or in small groups. They get acquainted first with the objective and nature of the programme and learn to handle the instruments. Subsequently, they will choose a problem to study. Evaluation of acquired knowledge is carried out as part of each assignment. In conclusion of their article, the authors submit the main results of a test designed to investigate the effectiveness and response of the A-T biology programme.

3.2

41. CREAGER, J.G.: Biology education: What next ?

The American Biology Teacher, 41, 1979, No.8, pp. 495-498, 512.

The author presents the main trends prevailing in the teaching of biology and attempts to predict future developments. She mentions trends in changes of the numbers of biology students at individual school levels and analyzes the reasons why university students choose biological disciplines. According to the data presented, the future number of biology students should decrease, but on the other hand the scope of their interests and needs should expand. The author further deals in great detail with various trends concerning curriculum development of the teaching of biology. She mentions the so-called "Proposal 13", "Back to Essentials", "New Harvard", "Open Approach" and "Equal Opportunities for Women" as the ideas of the principal trends. She further discusses the principal theories concerning intellect development, especially Piaget's, Ausubel's and Novak's. She also touches on some problems related to ethical education in biology. She concludes her article by some predictions of possible future development and ways how to influence it.

3.2

42. Anmerkungen zur Kritik am gegenwärtigen Biologieunterricht der Sekundarstufe II. /Comments on the criticism of contemporary biology teaching at secondary grade II./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.3, pp.169-172.

Most pupils at secondary grade II study biology courses. The curriculum data and the textbook structures seem to be suitable for the assessment and selection of these courses. Practising school educators, however, have pointed out for some time now to the crammed contents of these courses. They require that the content should be reduced, thus the courses raised to a higher quality level. The content of biology courses at secondary grade II should enable study at college or university on the one hand and prepare pupils for vocational study without attaining university-level education on the other hand. An advantage of reformed secondary trade II is the possibility of choosing the subject of study. Today, biology has become the most frequently chosen subject of study. It is to be regretted that at secondary grade I the numbers of classes are being reduced. This hampers successful work at secondary trade II. The author, defending the existing numbers of biology classes, mentions the importance of contemporary biology for society and asks that it should be primarily based on topical subjects playing a significant role in the life of the whole community, such as pollution and protection of environment, problems related to world nutrition, health education, gene manipulation, biological technology in production and industry, etc.

3.2

43. HARRIS, J.W.: Aboriginal science, western science and the problem of conceptual interference.

The Australian Science Teachers Journal, 24, 1978, No.3, pp.61-67.

The author deals with the problem of science teaching in those regions of Australia where the aboriginal language is still spoken. Pupils there have difficulties with understanding phenomena and processes expressed in terms different from the aboriginal ones. There exists the so-called double-culture educational concept, which need not always be a conflicting one. It is possible to define a number of spheres where cultural differences influence classroom work and the teaching and learning processes. The most important are behavioural patterns, home habits /such as food, sleep, etc./, pupils' stands and opinions and the so-called kinship structure according to which pupils are seated, put together in groups, etc. The author deals in detail with some specific aspects of teaching in an aboriginal school, such as the language used, method of communication, conceptual interference, comparisons between aboriginal science and western science, methodology of science teaching and curriculum content.

3.2

44. HICKS, S.: Science at Swinburne community school.

The Australian Science Teachers Journal, 25, 1979, No. 2, pp.31-36.
3 figs.

The author reports on science teaching at Swinburne community school, situated in Hawthorn, a suburb of Melbourne. Pupils are accepted without selective entrance procedure and they come from all social groups. In addition to classrooms and a lecture hall, the teachers also use for instruction the library, gallery, sports centre and laboratories belonging to a nearby technical college. The curriculum developed for the school is very comprehensive. Pupils are engaged in independent study, field exercises and short-term assignments. Within the curriculum, natural science has become part of a number of subjects. Student participation in lectures is completely voluntary. This, apart from positive aspects, also leads to some negative consequences. The author summarizes the integration of natural science into the curriculum. Students may choose between biology, chemistry and physics for eleventh grade. They may choose several subjects and spread them over two years. The author further presents some of his conclusions and experience with the above described method of teaching and mentions in greater detail the topic "The making of models".

3.2
45. HOLVANT, A.J.C.D. - HOOIJMAIJERS, H.P. - KOOT Van der, J.B.: Problems in physics education in the Netherlands.

Science Education, 62, 1978, No.3, pp.411-416.
3 figs., 5 tables.

In the Netherlands, similarly to many other countries, a new educational system was introduced in the 1960's. It differs considerably from the American system of education, but it is practically identical with the school systems prevailing in most European countries. The authors of this article deal in detail with its structure. They stress the main difference as compared with American curricula - i.e. relatively little emphasis laid on physics education /only 50 minutes per week in the final year/. A survey was conducted at schools preceding university; its results make up the following section of the article. The authors compare the relative representation of physics versus other subjects, the popularity of this subject with boys and girls. A survey was also conducted among teachers.

3.2
46. HURD, P. De HART: Back-to-basics: A critical juncture in biology education.

The American Biology Teacher, 41, 1979, No.3, pp. 181-182, 190.

The content of science education at schools is often not in keeping with latest findings. The public, especially the parents of students, require a return to the "basics". This does not mean to go back to earlier, more traditional curriculum, rather to enliven and to bring up-to-date the existing curriculum. It increasingly happens that on completion of basic biology education, students are not able to discuss the most serious problems, such as environmental control, endangered species, uncontrolled population growth, etc. The question arises what actually is the "basics" in biology education. The author attempts to find an answer to this question in his article. He analyzes in detail the general understanding of "change" which occurs several times in the life of every man. He also makes comparisons of different opinions concerning the request for a "return to the basics".

3.2
47. HURD - BYBEE - KAHLE - YAGER: Biology education in secondary schools of the U.S.

The American Biology Teacher, 42, 1980, No.7, pp. 388-410.

Four university teachers voice in an extensive study their joint opinion of biology education in secondary schools of the U.S. They subject to analysis and criticism educational objectives, textbooks and compare them with the existing biology education /in table form/. They express their opinions concerning the qualifications of biology teachers, their approaches to experiments, laboratory work and their techniques, including environmental trips. On the basis of their study they summarize in fifteen points the basic trends oriented on new progressive development in biology education.

3.2
48. KAHLE, J.B. - HURD, P. De HART - HARMS, N.: *High school biology education in transition.*

The American Biology Teacher, 41, 1979, No.41, pp. 210-213, 232.

The authors attempt to find answers to some questions important for biology teachers. The major problem is what should be the content of biology education so that acquired knowledge may be useful in dealing with phenomena and processes brought about by the accelerated development of science, technology and society. The authors summarize first some new trends that have appeared in science teaching in the U.S.A. since the year 1960. They report in greater detail on some surveys conducted as an introduction to the projecting of the future orientation of science education. They include research work carried out by the committee of the National Science Foundation, which investigated the state of science education today, the important objectives of this education and the most pressing needs with respect to the future. They also include the research work of the Biology Group, which dealt with the projecting of new trends.

3.2

49. KATMAN, U.: Dydaktyka i nauczanie biologii w RFN
/Didactics and biology education in the German
Federal Republic./

Biologia w szkole, 33, 1980, No.2, pp.118-120.

U. Katman, German biology didactics scholar wrote for the journal Biologia w szkole an article concerning the present state of biology didactics and biology education at schools of the German Federal Republic. A general school reform is being prepared in the German Federal Republic and biology didactics workers face the task of developing the new biology curriculum. Individual states of the German Federal Republic are, however, autonomous in cultural policies, which means that at present the updating of biology education in schools has reached differing levels in individual states. The school system is structured in the following manner: Primarschule comprises first to fourth classes of primary school, it constitutes the so-called first school level. The second school level constitutes secondary grade I /so-called Sekundarstufe I/, comprising fifth to tenth classes of basic school /Hauptschule/, secondary school /Realschule/, comprehensive school /Gesamtschule/ and grammar school /Gymnasialschule/. The highest level constitutes secondary grade II /Sekundarstufe II/, comprising eleventh to thirteenth classes of the former upper level of grammar school; it also partly integrates works schools. Teachers of primary, basic and secondary schools are educated at pedagogical college; their education also includes the study of special biology didactics. Universitites educate teachers for grammar schools and partly also for secondary schools. Their education comprises only specialised study, which means no study of biology didactics. Their didactic education only takes place during their practical training at schools in didactic seminars /Studinseminar/. Updating of biology teaching has taken place since 1960; according to American trends /BSCS/ and British trends /Nuffield/ textbooks and curricula in individual states are being gradually replaced by new ones. Kiel University established an institute of pedagogical sciences of science subjects in 1966; it is scientifically active in biology didactics and the didactics of other naturel sciences and science subjects. The author of this article further reports on some contemporary problems related to the updating of education.

3.2
50. KORMONDY, E.J.: College biology as a science and a profession.

The American Biology Teacher, 41, 1979, No.4, pp.214-216, 232.

The author deals with some aspects of college biology education. First, he presents a survey of the historical development of biology as an independent scientific discipline, begining with Galen and Hippocrates, via Descartes up to the 20th century with its significant discoveries. Changes in the conception of biology that have taken place in the last decades result in a number of consequences, such as the continuous dissemination of information or growth in research costs. All this results in the necessity to adapt also curriculum to the new trends and discoveries. The author states the inconsistency of biology curricula in the U.S.A. at all levels, as well as the fact that students beginning their study in 1980 will start their scientific work only at the turn of the century and that they will achieve their full efficiency as late as the following century. It is therefore necessary today to equip students at school with relevant knowledge and to teach them modern ways of thinking. The conclusion of the article is devoted to the problem of college instruction and research.

3.2

51. LEARMONTH, M.: Core thinking about science at Koonung high school.

The Australian Science Teachers Journal, 25, 1979, No.2, pp.25-29.
2 annexes.

The author of this article presents a survey of the development of science education at Koonung high school since the year 1973. At first, the programme was based on core units by using the textbook "Discoveries in Natural Science". Later, it has undergone gradual changes up to the present day. In its present form, it comprises a detailed study of core units, student research work, units enhancing the teacher's personal interest and supplementary units. Each course is supplemented with extensive material. This form of education entails two main advantages - it allows flexible teacher work and makes it possible to substitute units. Yet, it will be necessary to solve some problems concerning the number of lessons devoted to science, instructions for practical exercises, organization of the programme under varying conditions, etc. As illustration, the author includes into his article a description of a core unit /Geological Processes/ and a survey of all courses.

3.2

52. LOOSE, G. - PROBST, W.: Materielle Voraussetzungen für die Behandlung des Themas "Zelle" in Schulen Schleswig-Holsteins. /Material prerequisites for dealing with the topic "Cell" in Schleswig-Holstein schools./

Naturwissenschaften im Unterricht, 28, 1980, No.10, pp.342-351.
6 figs., 5 tables.

The authors present the results of their research conducted in 26 basic and secondary schools and in the school centre in Kiel /large city/. The research also included smaller towns with agricultural surroundings. It turned out that there was a big discrepancy between the requirements of biology didactics with respect to the dealing with the topic "Cell" and the actual material equipment in schools. Basic schools were best equipped, school centres the worst. The research investigated not only school equipment, but also scientific factors /requirements placed by specialized didactics/, legal factors /obligations stipulated by curriculum/, personnel factors /teacher qualifications/ and material factor /school equipment/. It also included manufacturers of teaching aids. On the average, there are 28 pupils in one class in Schleswig-Holstein schools; one microscope is available per two pupils, some schools have only few microscopes. Binocular microscopes are not available in all schools. Specialized laboratories have blackout, but not all. The same applies to other teaching aids. Two thirds of basic schools and one fourth of secondary schools do not fulfil basic prerequisites for the teaching of the above topic, they do not have specialized classrooms. One sixth of secondary schools and all basic schools have not enough microscopes, they cannot realize pupil independent work. There are not bigger differences between the equipment of urban and rural schools.

3.2

53. LOCAS, A.M.: The development of a curriculum monopoly in Australian secondary schools: Biological science: The web of life.

Journal of Biological Education, 14, 1980, No.1, pp. 15-28.

This is an extensive critical article dealing with the biology textbook entitled the "Web of Life". It was published in 1967 and quickly spread throughout all Australian secondary schools. The book is a textbook, laboratory handbook, teacher handbook and a sort of audio-visual aid for biology popularization, all in one. The author of the article describes in an interesting manner the state of biology education before the introduction of the above textbook, its original American model, its first Australian edition and the response of Australian teachers, its second edition and its future. He does not hesitate to disclose his concern about this monopoly textbook which in his opinion will adversely affect the development of biological thinking of students rather than it should purposefully lead them to higher knowledge.

3.2
54. MALCOLM, G.: Germany's IPN physics and Australia's physical science - science in its social context.

The Australian Science Teachers Journal, 25, 1979, No.1, pp.15-22.
1 fig.

The author discusses in his article the physics curriculum in the German Federal Republic, as developed by the Centre for Natural Science Education /IPN/. The concept of physics in this curriculum is very similar to the Australian curriculum of physical science /entitled Man and Physical World/. For that reason, the author makes comparisons between both concepts. He deals first with the educational content of the curriculum. The Australian Physical Science is designed for primary school second-grade pupils and it constitute preparation for secondary school study. In the German Federal Republic, IPN physics is taught in four types of secondary school throughout the country. Other aspects of comparison of both curricula are principles stipulated for the setting up of educational objectives, the process of innovating the content of the curricula and teaching methods. As illustration, the author presents a schematic describing the interconnection between the main sections of the topic "Energy supply by means of nuclear force". In conclusion, the author states that the curricula designed for physics education in the German Federal Republic and in Australia are similar in their efforts to discuss the nature of science and their social contents and in laying emphasis on the maximum extent of personal responsibility and activity of students.

3.2

55. MARTIN, M.D.: The assessment of performance unit-national performance on what core ?

The Australian Science Teachers Journal, 25, 1979, No.2, pp.43-52.
3 figs.

The author discusses in her article the Assessment of Performance Unit /APU/, focused on natural science. In its introductory part she briefly mentions the background of APU /composition of the founding group, initial materials, main methods of work and experience achieved so far in Australia/. The following chapters deal in greater detail with the science aspects of the unit. The main activities are divided into six categories /symbolical expression, use of apparatus, observation, interpretation, application, planning of research and execution of research/. Different natural science concepts are discussed. As an example from the field of interpretation and application, the author presents the case of planting two bushes with the environment of one of them being covered by a dark foil. Another example deals with the field of astronomy - an interpretation of the photograph of the nocturnal sky with visible curved trajectories left by stars.

3.2
56. MAYER, N.V.: Forward to Fundamentals.

The American Biology Teacher, 41, 1979, No.4, pp. 204-209.

It is possible to observe specific cyclical returns to teaching methods in the history of education. This observation may also be applied to the trend of going "back to fundamentals" even though there exist some differences in this case. The author points out to the risky elements of the movement "back to fundamentals", stemming from its erroneous conception and the hasty acceptance of these concepts. He discusses the dispute between the "conservative" and "progressive" movement, i.e. between the advocates of the "return" who actually only copy obsolete curriculum and the members of the movement "forward to fundamentals" who call for the teaching of fundamental principles in biology instead of mere facts. In the following chapters the author discusses the mutual relationship existing between administration and education, problems related to the movement "return backward", alternatives of changes in the movement and the role played by the National Association of Biology Teachers in the entire matter.

3.2

57. MONTGOMERY, L. - BENNET, L.M.: Minnemast: Is it an acceptable instructional mode for Kindergarten?

Science Education, 62, 1978, No.3, pp.319-323.
1 fig., 1 table.

In the 1960's a number of new curriculum projects appeared designed for all school types which had brought about the necessity of innovating elementary school education. Kindergarten lends itself as the most suitable point of departure. The objective of the study the authors deal with in their article was to test and assess the effectiveness of one standard science unit called MINNEMAST, designed for kindergarten. The researchers made use of the method of experimental classes which attended the unit and of control classes which did not attend it. The sample consisted of 129 preschool-age children from three schools. The MINNEMAST programme coordinates science and mathematics concepts so as to develop in children an understanding of these concepts as compared with the conventional memorizing of facts.

3.2

58. MOSS, S. - THEOBALD, D.: An answer to the teaching of ecology.

Journal of Biological Education, 13, 1979, No.1, pp. 17-24.
5 figs., 2 tables.

The authors analyze and discuss reasons why in many cases ecology is not taught in schools by practical methods. They describe an approach to ecology education developed in Kenya, based on a workbook made up from integrated exercises and on teacher courses. Teachers investigate hypotheses concerning the spreading of plants and animals, climatic phenomena, soil, organism adaptation to environment, etc. Each topic also includes simple constructive measurements by means of cheap aids. Obtained data are processed into charts and tables. The initial hypothesis is then tested. The above described investigations and work methods have proved successful in Kenyan conditions and may also be recommended to teachers in other countries.

3.2
59. NATH, H.: Zur gegenwärtigen Lage des Biologieunterrichts an den Gymnasium in Schleswig-Holstein. /On the present state of biology education in grammar schools of Schleswig-Holstein./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.8, pp.501-506.

The author reports on the present situation prevailing in biology education in grammar schools of Schleswig-Holstein, which work according to the new curriculum. Obligatory instruction in grammar schools took 5.6% in 5th-10th grades in the school year 1978/79 /11.3% lessons were not taught for lack of specialized teachers/; the situation is better in secondary schools, the proportion of biology made up 5.9%, only 10.2% were not taught for lack of specialized teachers/. Forty teachers are educated and graduate yearly in Schleswig-Holstein, most often in specializations biology-chemistry, least often in specializations biology-German. A shortage of biology teachers will occur in 1983-1984. The author also deals with curriculum changes, changes in school organization, requirements on school-leaving examinations, equipment of school laboratories, library stocks. In grammar schools in the basic course, biology is allotted 3 lessons per week, in the biological stream 5 to 6 lessons per week. The author also discusses the state of biology education at orientation level and at secondary grade I. He evaluates the objectives of biology education and interdisciplinary problems as reflected in the curriculum /biochemistry, biophysics/.

3.2
60. MELANCE, E.E.: Science-society mini-courses hit home !
The Science Teacher, 47, 1980, No.6, pp.26-28.
1 fig.

The survival of our civilization is partly dependent on our ability to adapt ourselves to technological development and to cope with changes it brings about so that they may stay under control of society. Such control may only be realized through a general understanding of nature, its potential and limits and through an understanding of technological trends. Technological progress, too, cannot be grasped without respecting social, economic, political and psychological forces. For that reason, science-society mini-courses should be established in instruction and education of young people, the author, a secondary school physics teacher, states and outlines their structure in his article.

3.2

61. OGDEN, W.R. - JACKSON, J.L.: *Secondary school biology teaching, 1918 - 1972: Objectives as stated in periodical literature.*

Science Education, 12, 1978, No.3, pp.291-302.

The article deals with research which is a modification of the preceding study focused on chemistry. The objective of the research as described in the article was to prepare a chronological history of selected objectives for biology teaching in U.S. schools in the period 1918-1972, as reflected in periodical literature. The whole period was first divided into subperiods on the basis of important events that had occurred in the history of the United States. Six periodicals were selected for investigation; their contents were investigated from several points of view. According to subject, the researchers categorized them into ranges of cognitive articles, articles dealing with various processes and procedures, articles enhancing interest or applying science knowledge to the cultural history of society. Obtained data were then assessed from three points of view - what was the frequency of subjects, what was their distribution in individual categories and what main educational groups were defined. The results were summarized in tables, accompanied by an extensive legend.

3.2

62. PAGE, R.: School based curriculum decisions in South Australia.

The Australian Sciance Teachers Journal, 24, 1978, No.2, pp.27-30.

The year 1970 was marked by considerable changes in state school education in South Australia. A decree was issued permitting schools to develop curricula according to their own needs. Apart from other things, this meant that a greater respect could be paid to student needs. In addition to existing textbooks, new handbooks and materials started to appear which often confused teachers. The workers of the Secondary School Curriculum Committee therefore developed a methodological handbook "How to Develop Curriculum". The process of reorganization has practically been completed at the time of writing. Problems with developing new curriculum were investigated by means of a questionnaire. The author mentions some of them and analyzes them. In conclusion, he sums up some possible or desirable trends with respect to the future, concerning the content of materials provided to schools, the activities of the Secondary School Curriculum Committee, teacher education, cooperation between schools, establishing of new schools and the future curriculum development.

3.2
63. PRESTON, M. - McKENZIE, S.: Review of a year 8-10 science course - A case study.

The Australian Science Teachers Journal, 24, 1978, No.2, pp.41-44.

Teachers at Kenmoor secondary school encountered difficulties with the implementation of the basic science course in 8th to 10th grades. These problems were caused both by inadequate laboratory equipment and by inadequate knowledge of preceding subject matter of students of higher grades. In their article the authors describe the steps that had been taken to put matters right. Regular weekly meetings with teachers were chosen as the basic technique of problem-solving. At first, they investigated teachers' opinions of science education. Further, they made a force-field analysis, i.e. an analysis of forces which prevented the bridging of the gap between the existing and the desired situations. They used a method called brain training. It consisted of four steps: recording ideas in free discussion, clear definition of problem, identification of blocking forces and detailed discussion on conclusion-making.

3.2
64. Project d'organisation de la ecolarité des lycées. /Project of organization of grammar school education./

Biologie-Géologie, 67, 1980, No.1, pp.54-65.

The association of French biology and geology teachers works consistently for a better representation of science education in primary and secondary schools. They critically comment on governmental programmes and submit their own proposals how to organize time-table. In this article, they compare a governmental proposal with their own ideas and also include a number of journal articles dealing with this subject, as well as a description of a parliamentary event.

3.2

65. ROBOTTOM, I.M.: Science in the core of a primary school curriculum.

The Australian Science Teachers Journal, 25, 1979, No.2, pp.53-60.

The author deals in his article with the problem of representation of science in the core of primary school curriculum in Australia. Various surveys point out to the fact that little attention is devoted to science. The author compares two main types of school curriculum. The first is curriculum developed by the school itself which reflects the actual conditions prevailing at the school. The other type is the so-called core which is developed at various levels /school, governmental, national levels/. It is the national core that is discussed by the author in detail in his article. He discusses first the various concepts of the term "core". He defines it from three points of view - epistemological, social and in connection with teacher efficiency. In the following chapter, the author analyzes science in the core of primary school curriculum. It defines as the main organizational element the acquisition of productive skills. It is possible to document it very well on the example of the programme "Science 5/13", which is discussed in detail in the article.

3.2
66. ROSENTHAL, D.B.: A "Science and society" course for high school students.

The American Biology Teacher, 41, 1979, No.6, pp. 336-353.
1 table.

The author presents her experience with the course entitled "Science and society" she had helped to develop and later taught in secondary school. The basic idea of the course is that science is the main force affecting our society, everyday life and determining the future of mankind. The author discusses some aspects of the course, such as its structure, source of materials used and student response. The general concept stems from two principal attitudes to science - the first supports their integration into curriculum, the other may be characterized by disappointment over the threat of nuclear war and growing environmental pollution. In view of these various attitudes, ethical problems are also integrated into the course. The content of the course is subdivided into five sections dealing with relationships prevailing between science and society, questions of populations, food resources, problems of medicine and genetics a finally the responsibilities of government, scholars and ordinary citizens.

3.2

67. ROWELL, J.A. - CAWTHRON, E.R.: What is science, what should it be: A preliminary report of an empirical study of images.

The Australian Science Teachers Journal, 24, 1978,
No.2, pp.81-85.
1 table.

The authors report on an investigation designed to find answers to some questions concerning the Australian educational system with respect to science. As the first step, the researchers developed an epistemological questionnaire . Questions were evaluated by means of a 1 - 5 scale, from strong positives to strong negatives. The subjects answered each question twice - what was the reality and what was his or her image. Altogether, the questionnaire consisted of 45 questions and it was submitted to 307 university students and personnel. The questionnaire was evaluated in two stages. The authors report only on the first stage, focused on the extent to which the subjects agreed or disagreed with individual questions. The results were summarized into a table included in the article. T-test was used for comparing "what is" and "what it should be" answers.

3.2

68. SMITH, D.L.: Some essentials for the effective development of school-based curriculum decision making.

The Australian Science Teachers Journal, 24, 1978,
No.2, pp.55-62.

Curriculum constitutes an integral part of implementation of school main function. Two main problems in curriculum decision making are to decide what knowledge is most necessary and how to convey it to students in the most effective manner. These questions may be satisfactorily answered only if they are related to a specific connection. This opinion is a characteristic feature of a new trend in curriculum development in Australia and U.S.A., i.e. school-based curriculum decision making, which means shifting responsibility from centre to periphery. The author attempts to define in his article some important features of successful curriculum decision making. He considers four factors the major ones. These are primarily substantial changes in the relationship between the central school system authority and school. Further, he considers it necessary to maintain a sensitive, open and democratic approach to jurisdiction distribution and responsibility at school. A great importance is ascribed to changes in teacher role; both structural and personal support is also necessary.

3.2

69. SPÖRLE, E.: Gedanken zur gegenwärtigen Situation der Schulbiologie. /Considerations concerning the present situation prevailing in school biology./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.8, pp.494-500.

The author presents his experience with school practice, seminar works, visitations in lessons, interviews with teachers and with biology students, school-leaving examinations and the present state of biology teaching. He wonders whether contemporary updated biology education really fulfills all tasks and objectives it has set up. He makes conclusions with respect to the future. Updating of biology education has been in progress for a number of years; in the initial stage it was "courage to gaps", followed by exemplary teaching which tackled the problem of biological knowledge explosion. It has turned out that the exemplary concept prevailing today is able to solve the question of updating the content of education with respect to biological knowledge explosion that has recently taken place. The author evaluates teaching aids. He considers most valuable original objects and also aids facilitating an active approach to and contact with nature, immediate study of biological objects through observation and experiment. As regards substitutions of original objects, the author critically evaluates, for example, the use of foils /transparencies/, worksheets, projection of microscopical specimens, pointing out to their advantages /time savings, group observation/, but also to their disadvantages /separation from nature, the pupil becomes a passive recipient of information/. He indicates where such aids are in place and where not. He stresses the importance of the teacher's sketching on the blackboard and correctly prefers it to the projection of a ready-made foil. He also takes a correct critical stand to projected tables, charts and diagrams and underlines that the most important thing is pupil cooperation in drawing up these tables on the blackboard. In conclusion, the author evaluates the work being done on the development of the new biology curriculum in the individual states of the German

77

Federal Republic and demonstrates that the number of lessons /with the exception of the upper grade of grammar school/ has remained the same, the content of education has increased, pressures on biology teachers have persisted.

3.2

70. STEENTOFT, M.: Biological education in Denmark.
Journal of Biological Education, 13, 1979, No.2, pp. 91_101.
3 tables, 1 fig.

The author presents a survey of the legislation of the Danish school system. She describes the objective and curriculum of biology education in five basic sectors of teacher qualifications. She stresses two principal effects influencing the educational system, i.e. parental influence, particularly at primary school level, and ministerial influence. The five sectors dan be divided into three levels separated from one another by entrance examinations, i.e. primary school, grammar and secondary vocational school and colleges and universities. The author analyzes in detail individual types of educational facilities including a brief survey of historical development. The author always mentions pupil age groups, principal objectives of biology education set up for a specific level and some specific subjects.

3.2

71. STREY, G.: Zum Defizit der Biologiedidaktik. /On the deficit of biology didactics./

Naturwissenschaften im Unterricht, 28, 1980, No.6, pp.176-184.
3 figs.

The author analyzes the present position of biology didactics in the German Federal Republic. He focuses his attention on attitudes to biology didactics. Biology didactics is usually misinterpreted as a specialized science and it only concerns itself with the content of specialized science. On the contrary, biology didactics must be pupil-oriented. The pupil cannot be only a subject of speculation, but he must become a subject of study. Contemporary didactics is oriented only on specialized science, it forgets empiricism and the problem of standards and terminology of biology didactics. As a consequence, the content of biology didactics is identical with the content of the specialized science. This results in a lack of knowledge of pupil initial situation for lack of information about him. Pupil work is made more difficult by the considerable heterogenity of school biology. There is an absence of a modern and suitably structural concept of biology didactics. The centre of the field of view in biology didactics must be taken by the teacher and the pupil, the relation to specialized science has only a control function. The structurization of the teaching subject must respect relations to pupil life reality /analysis of didactic field/, gradually process individual subject-matter complexes, define pupil initial and final situations. Every partial step in the teaching and educational process must be didactically analyzed and justified.

3.2

72. SYPILA, A.: Korelacje przedmiotowe w nauczaniu ochrony przyrody w Finlandii. /Interdisciplinary relations in nature protection education in Finnland./ Biologia w szkole, 33, 1980, No.3, pp.150-151.

The objective of nature protection education in Finland is to build up in pupils a responsible attitude to all forms of life and to make it possible for them to learn man's dependence on healthy environment. Pupils also become acquainted with natural resources, their reasonable exploitation and protection. It is demonstrated to them how man, by unreasonable interference, can damage or even destroy environment. The protection and creation of environment constitutes an interdisciplinary problem, solved not only by biology, geography, but several other subjects, such as social science /civics/. Biology plays the central role in school implementation of tasks related to the protection and creation of environment. The Finish curriculum, however, ascribes also special tasks to geography, physics, history, civics and aesthetical education, chemistry, home economics and hygiene. A table indicates interdisciplinary relations laying emphasis in the protection and creation of environment on ecological, moral and ideological, practical and aesthetical, technical, administrative and legal and medical aspects.

3.2

73. TAIRA, K.: History of science education in Japan since 1945.

Science Education, 62, 1978, No.4, pp.585-589.

The author presents in his article a survey of the Japanese school system, focusing his attention on science education, and compares it with the same field of education in the United States, beginning with the year 1945, when a new organization of the school system was set up. It was categorized into primary education /6 - 12 years/, middle education /12 - 15 years/ and secondary education /15 - 18 years/. The new curriculum and teaching guidelines were developed accordingly. The American model was integrated into Japanese education in the years 1959-1950. A reform was carried out in 1951 which laid emphasis on the experimental aspect of the curriculum. The author presents his data in a broader context, in which the changes in the school system have taken place, such as social, economic and ethical factors. In conclusion, the author states that education in Japan has always been strongly influenced by American education, both in the case of individual reforms and long-range gradual effects.

3.2

74. THEISS-SEUBERLING, H.B.: *Ein biologisches Konzept. 1. Teil: Anthropologische Aspekte zum Biologieunterricht auf der reformierten Oberstufe.* /A biological concept. Part 1: Anthropological aspects concerning biology education at reformed upper level./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.2, pp.33-42.
1 fig.

The updating of biology education at school requires the didactic modification of the selection of the subject-matter content for biology teaching. This requirement plays an especially important role in biology which, as a science, has made an extraordinary progress in this century and has expanded its knowledge in all disciplines. When teaching biology at school, it is therefore necessary to focus attention only on fundamental subject matter. A hundred years ago, static biology was taught at school; today, biology education must be in keeping with the contemporary state of science, it must be oriented on modern biological thinking, lay emphasis on the developmental idea, get biology teaching closer to everyday life and, primarily, it must be focused on man and on grasping what is life. Society, unfortunately, still underrates biology and teaching lessons are still being reduced. To improve the existing situation, cooperation is necessary between scientists and didactic workers, suitable selection of topics and content of school biology, attention should be focused on identification of methods of biology as a science and on demonstrating students how biology as a science has arrived at its fundamental findings. All this requires a new biology, created by cooperation of scientists and didactic workers for the needs for the present-day society.

3.2

75. Begranzte Chance für die Erneuerung des Biologieunterrichts in der reformierten gymnasialen Oberstufe. /A limited chance of revival of biology education at reformed grammar school upper level./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 1, pp.4-10.

The author analyzes the history of biology education at upper grammar school level in the German Federal Republic. Various conceptions have been set up concerning the upper level of grammar school,none, however, has asserted itself due to the contradiction between requirements placed on general basic education and extended scientific education. The lower and upper limits of requirements have been defined, both basic requirements applying to all students and also requirements applying to the preparation of college and university study in the field of biology. At the upper level, biology has become an elective subject to be chosen from three subjects. In practical choice, biology has become the major subject with respect to the secondary school-leaving examination, for biology education is better materially provided than physics and chemistry education: yet, the more graduates majoring in biology schools produce, the fewer chances of employment they will find in practical life. The author points out to the difficult position of biology didactics. Workers in this didactic discipline must be active both in specialised science and in pedagogy. This requires from them to have a command of two terminologies. Biology didactics must build up and reinforce its own didactic terminology in biology and pedagogy. Their work is also being made more difficult by the negative attitude of biology specialists to biology didactics. This underrating of biology didactics is also reflected in teachers, but it is dangerous for further development of education. On the other hand, biology didactics must raise the quality of its work, improve its content, objectives, aids, methods, etc. It is recommended to establish study centres for biology didactics, to make more precise research into biology didactics and to contribute significantly to the development of curriculum and syllabus.

3.2

76. TROMMER, G.: Die Verwirklichung grundlegender Bezugskategorien der Oberstufenreform im Biologieunterricht. /Implementation of principal reference categories of upper level reform in biology education./

Praxis der Naturwissenschaften, 29, 1980, No.3, pp. 74-85.
7 tables.

The following reference categories apply to the present-day state of upper level reform /secondary level II/: orientation in science, in scientific biology, specialized content of biology as a teaching subject and general maturity for college or university study. The author deals in detail with these basic reference categories applying to biology education at secondary level II, presents his idea of structuring biology as a teaching subject, as well as its objectives and tasks. He stresses the necessity of correct, scientifically grounded content of biology, he warns against the falsification of biological findings and points out to the important tasks facing biology education at the time of technological and ecological crisis and the possibility of military catastrophy of mankind. Biology teaching requires integration, flexibility, creativity of thinking as well as technical and experimental thinking. The author discusses topics and their relation to educational objectives. As for objectives, he lays emphasis on education to environmental protection.

3.2
77. WARING, M.: Social policy, professional responsibility and the science curriculum.

The Australian Science Teachers Journal, 25, 1979, No. 2, pp.5-13.

The author presents in her article a survey of the main trends prevailing in science curriculum development in British education. In England and in Wales, the 20th century can be characterized by the efforts to leave it up to the teachers themselves to make the decisions what and how to teach. The decree of the year 1944 only recommends that the curriculum should comply with the age and abilities of pupils, be acceptable for parents and should also include religion. In this method of curriculum development a key role is played by the teacher's personal responsibility which stems from his or her experience, knowledge and sensitive perception of the class as a whole, as well as internal and external effects. The method of individual modifications and development of curriculum by the teacher has undergone changes which are gradually discussed by the author in her article. In the 1970's, efforts appeared again to subject curriculum to a specific central management. Surveys have been conducted assessing the existing situation and conclusions have been made with respect to the future. The method of cooperation seems to be the most suitable and effective trend in curriculum development, maintaining teacher autonomy under given conditions.

3.2
78. WHITE, R.T.: The place of sciences in the curriculum. The Australian Science Teachers Journal, 26, 1980, No.1, pp.5-8.

The author deals with the question whether science is a useful /necessary/ component of the curriculum and with the problems of the student as an individual in a society. He pays a special attention to the phenomenon of ability. He analyzes its components, which are images, i.e. mental pictures, episodes, rememberances of past events in which the individual has played a role, verbal knowledge, such as a memory collection of facts and intellectual skill or aptitude /as compared with simple facts/, able to carry out a number of tasks, even those which are dealing with things he or she has never seen before, such as the solving of a collision problem, the ability to complete a chemical equation, to be able to classify plants. He considers able such a person as has managed to cope with tasks the society needs for life.

3.2

79. WOOD, J.H.: Nuffield biology at Withypool, England.
The American Biology Teacher, 41, 1979, No.2, pp. 110-112.
3 figs.

The author presents his experience with teaching in a science centre in Exmoor, where he came on an exchange scheme. He had a class of 18 pupils with whom he studied the ecological relationships occuring on a moor, they investigated water streams as communities, recorded examples of succession on bare rocks and investigated forest growths. Weekly field exercises are completed by all classes with basic science education, always towards the end of the school year. The centre is equipped with laboratories and an extensive library. The pupils come to the laboratory every morning to be set their assignments, they work in the field during the morning and devote their afternoons to the study of literature, laboratory work, etc. The author mentions in his article the themes of some assignments. This Nuffield biology course has a number of advantages - it lays emphasis on the understanding instead of the mere gathering of facts, on research instead of passive instruction, and the like.

4

80. **HORNÍK, F.:** Použití matic k didaktické analýze učiva. /Using matrices for didactic analysis of subject-matter./

Přírodní vědy ve škole, 31, 1979/80, No.10, pp. 322-363.
3 figs.

Teaching and educational objectives constitute a specific interpretation of the purpose and concept of a subject. The procedure analyzing these objectives and values of biology subject matter and preparing thus the subject-matter for teaching itself is called didactic analysis. It results in preparation of the subject-matter for transformation into pupil consciousness, i.e. the determination of a didactic system pertaining to a specific teaching unit. Optimum variants of this didactic analysis are being sought today. One possible alternatives of determining the structure of the subject-matter is the use of matrices.

Rectangular matrices are used in didactics, which is an array of numbers /matrix elements/ set out in rows and columns. The number of squares equals on each side the number of selected concepts /knowledge, facts/. These concepts are entered into the first row and the first column of the rectangular network. On its completion, the mutual relationships are analyzed between concepts by the mutual comparison of each concept with each other concept. If there exists internal relationship, it signifies a relationship of coordination which can be identified into a superordinate and subordinate relationship.

If there does not exist this connection between the concepts, we talk of a relationship of difference. Within this relationship, it is possible to identify the relationship of assignation.

The order of interpretation of concepts in teaching will be determined according to the descending number of superordinate relationships in a deductive procedure and vice versa in an inductive procedure.

4

81. KOTALOVÁ, D. - KORÁBOVÁ, A.: Cíle a úkoly výuky přírodopisu na základní škole. /Objectives and tasks of science teaching at primary school./

Přírodní vědy ve škole, 31, 1979/80, No.4, pp.131-132.

The objective of science teaching in the fifth to the ninths grades of primary school is to present to pupils a compact system of fundamental knowledge of living and non-living nature and the laws of its development. Pupils are expected to get acquainted with some methods and means of nature observation, with the significance of basic biological and geological knowledge with respect to some important spheres of human activities, i.e. especially in production, health services, environmental protection, health protection, exploitation of natural resources, etc.

4

82. ROŠICOVÁ, L.: Příprava náslechových hodin přírodopisu a základní kritéria jejich hodnocení. /Preparation of visitation science lessons and the basic criteria of their evaluation./

Přírodní vědy ve škole, 31, 1979/80, No.2, pp.51-53.

A correct preparation of the teaching lesson entails a precise definition of the teaching and educational objectives. They will determine the content, methods, forms and teaching aids. The written preparation of a visitation lesson should be submitted to all visitors before the beginning of the lesson. This will enable them, during the lesson, to evaluate the teacher's creativity, method of communication with the pupils, his or her work style and the selection of specific work methods.

5

83. FRONĚK, J.: Zkušenosti z experimentální výuky zoologie v 6. ročníku ve školním roce 1978/79. /Experience with experimental zoology teaching in the sixth grade in the school year 1978/79./

Přírodní vědy ve škole, 31, 1979/80, No.7, pp.249-252.

The objective of the experimental testing of biology teaching in the sixth grade was to investigate the development of the concept-forming process and its controlling by the teacher, the interpretation of the teaching content from the viewpoint of teaching and learning and the educational formation of pupils and the investigation of the relation between the acquisition of basic knowledge and the formation of the ability to apply it to relevant thematic ranges.

The evaluation of the experiment, teachers' comments and suggestions are separately processed in the article with respect to individual thematic ranges. It is possible to state that the subject-matter has, with negligible exceptions, been managed, pupils have worked actively and with interest. Problems have appeared in the material provision of teaching, especially the provision of living objects.

5.3
84. TŮMA, V.: Poznámky k učivu biologie na SZTŠ. /Comments on biology subject-matter at secondary technical agricultural school./

Přírodní vědy ve škole, 31, 1979/80, No.1, p.11.

The author presents in his article some critical comments on biology education at secondary technical agricultural school. The new curriculum is based on general biology, which makes it more interesting for the students, yet also more difficult. The topics Plant Physiology and Genetics are especially difficult. The extensively conceived topics in the curriculum do not enable adequate reinforcement of the material. The way they are processed in the textbooks is also not completely satisfactory. On the other hand, there are no problems with ethology and ecology.

5.4

85. FRONĚK, J.: Spirální rozvíjení poznatků ve vyučování základům biologických věd na základní škole. /The spiral development of knowledge in teaching biology science essentials at primary school./

Přírodní vědy ve škole, 31, 1979/80, No.4, pp. 130-131.
1 table.

The spiral development of subject-matter facilitates a continuous enrichment and build-up of pupil knowledge. Pupils come across the same subject-matter in higher grades, only on a higher level. An important foundation for science subject-matter is laid by science basics in the first and second classes of primary school, followed by science classes in the third and fourth classes, constituting a transition between the science basics and science subjects taught at the upper level of primary school. The author points out to the continuity in science teaching in the fifth grade in relation to the preceding science education, as well as the continuity, succession and gradual knowledge enrichment in science teaching in the following classes of primary school.

6.1

86. ALBERT, E.: Development of the concept of heat in children.

Science Education, 62, 1979, No.3, pp.389-399.
1 fig.

The general problem which motivated the study the author reports on in her article was to investigate how children, as organisms living in a complex environment, develop some concepts. In the introductory part of her article, the author compares several possible approaches to this problem. She selected heat as the principal concept for the study. The main background data evaluated in the study were obtained from approximately 40 interviews conducted over an eight-month period. The order of questions was set for the interview, such as "give examples of heat", etc. Five- to nine-year old children were investigated in the survey. The obtained data were processed in two phases - the identification of "thought patterns" and later on their classification. The following categories were identified, such as "Hot Bodies", "Unstable Nature of Heat", "Heat as One-Dimensional Quantity", "Composition of Heat as Independent Quantity", "Mechanical Energy as Heat Source" and others.

6.1

87. BORTONE, S.A.: A conceptual model for the study of evolution.

The American Biology Teacher, 41, 1979, No.9, pp. 562-563, 565.
1 fig.

The interpretation of the basic principles of evolution often meets with lack of understanding in students. This is especially caused by the isolated nature of individual topics so that students cannot grasp the connections between individual biological disciplines. A conceptual model, described in the article, is a suitable aid to overcome this problem. The model consists of three basic concepts: the first explains the question of an individual and the relations between a genotype and a phenotype. The second indicates factors affecting an individual and, on the other hand, factors affected by an individual. The third concept demonstrates changes an individual brings about in the following generations. The whole model is schematically depicted. Its application is variable to a great extent, for its individual concepts can be applied separately. Similar models can be constructed on its basis.

6.1
88. ELEK, S.: Mennyiségi-minőségi változásob az általános iskolai biológiatanításban. /Quantitative and qualitative changes in biology teaching at primary school./

A biológia tanítása, 19, 1980, No.1, pp.1-3.
3 figs.

The author demonstrates on three biological examples the so far inadequate use of the potential of dialectic planning. He illustrates on the first example /From Egg to Butterfly/ the development of quantity into quality in the butterfly. The fact that most five-graders consider the developmental stages of egg and larva inorganic testifies to the shortcomings of the textbook and the teacher's educational activity. Pupils' opinions change into correct ones only in the sixth and seventh grades. This error could be forestalled; the above theme facilitates the demonstration of continuous movement, change and development in nature. The second example /From Prehistoric Ancestor to Cultural Species/ is also used to demonstrate quantitative-qualitative changes, in the course of domestication. The concepts of nature cognizability, of the role of science are used here. The third topic /From Germinated Seedling to Leaf/, dealing with an observation of germination and development of bean demonstrates, in the same manner as the previous examples, that this method can be applied to teaching of dialectics and the material substance of living nature, without using the concept of dialectical materialism.

6.1
89. KADURINA, E. - GEORGIYEVA, P. - MILUSHEVA, E. - MITOVA, M.: *Razvivane na samostoyatelnata aktivnostna uchenitsite v protsesa na formirane na panatiyeto "khranene" v kurse po anatomiya i fiziologiya na chloveka chrez prilagane na problemniya podkhod.* /Developing pupil independent activity in the process of building up the concept of "nutrition" in the course of human anatomy and physiology, while laying emphasis on the problem approach./

Biologiya i khimiya, 23, 1980, No.1, pp.13-22.

The basic problem to deal with in teaching the topic of the digestive system is: "The working of the supply of nutrients necessary for cell metabolism". Before the teacher starts dealing with the material itself, broken down into five lessons, he will draw on zoological and botanical knowledge and will find out, by problem-based questions, what the pupils know about plant and animal nutrition. Then, he will analyze with the pupils the biochemical processes taking place in the cell, making use of the working of ribosomes and mitochondria. - He will explain the material discussed in the first lesson by concepts of nutrition" and "nutrients". In the second lesson, designed to discuss the theme of "Oral Cavity", he will deal with mechanical and chemical transformations of nutrition and nutrients. The third lesson, designed to deal with the subject of "Stomach", will deal with the explanation of digestive processes in the presence of stomach juices and their comparisons with the digestive processes taking place in the oral cavity. The fourth and fifth lessons, designed to deal with the subject of "Intestines", are laboratory exercises in the course of which the pupils will grasp the complete decomposition of nutrients into their constituent elements.

Both laboratory exercises will be carried out under specific conditions indicated in tabular surveys summarizing the digestive processes.

The results of pupil independent laboratory activities are also summarized in tabuler form, covering three successive school years.

The results indicate that problem situations, if conceived as starting points for independent thought, generate the cognitive need in pupils and create conditions for an active acquisition of new knowledge.

6.1

90. LAUFENS, G. - DETMER, B.: Untersuchungen am Verständnis der Wirbeltier-Klasifizierung. Ein Beitrag zur Begriffsbildung im Biologieunterricht. /Investigation of comprehension of animal classification. A contribution to concept formation in biology teaching./

Der Biologieunterricht, 16, 1980, No.2, pp.28-51.
3 figs., 8 tables.

The author deals with the problem of building up systematic concepts in biology teaching. He points out to the mental concept-forming processes in children and pupils of various ages, where he distinguishes three levels. Children aged 2.5 to 5 years classify objects presented to them without plan or according to changing viewpoints, pupils aged five to seven classify objects presented to them according to common characteristics, but they are mostly not able yet to classify according to hierarchy; it is only older pupils that are able to do this. Nevertheless, even at the age of twelve, it was experimentally determined that pupils were mostly not able to assign objects to a corresponding systematic group. Classification based on comparison /identification of agreement and differences/ constitutes the basis of systematic thinking. The author reports on an experiment designed to investigate whether, with the teacher's help, even pupils of junior classes were able to do systematic and hierarchic classification. He conducted the survey in schools in Cologne and its vicinity. He points out to the fact, however, that in the three to four lessons he had available in the schools and in classes it was not possible to create prerequisites for the formation of systematic concepts. Systematic concepts can only be built up on the basis of formation of necessary supportive essential concepts /morphological, anatomical, ecological, physiological/.

6.
91. STEWART, T.J. - KIRK, J.Van - ROWELL, R.: Concept maps: A tool for use in biology teaching.

The American Biology Teacher, 41, 1979, No.3, pp. 171-175.
3 figs.

The authors describe an aid found useful in both the teaching and learning of concepts, the so-called concept map. The authors present their own experience, for they have contributed to its development. The concept map is actually a schematic of the basic concepts pertaining to a specific discipline which presents both the basic information on a subject and the relationships between concepts, while the extent and content of the map is always a matter of its user. Certain principles must be observed in developing the map. One of them is the definition of the main concepts and principles that should be included in it. These are then arranged in two directions - horizontal and vertical. The concept map can be used in teaching both as a specific source of information and as a method of evaluating pupil knowledge.

6.2

92. **MOREIRA, M.A.:** Experimental college physics course based on Ausubel's learning theory.

Science Education, 62, 1978, No.4, pp.529-545.
2 figs., 11 tables.

The author discusses the teaching and learning of physical laws. This is a new system of courses introduced in colleges in Brasil. It was developed by reorganization of the previous study programme, by application of Ausubel's learning theory. The study, described by the author in his article, investigated the difference in the ability to apply, derive and classify electromagnetic laws, stemming from Ausubel's approach in comparison with the traditional method of learning. Ausubel's theory is generally characterized first and compared with the traditional approach. The survey was conducted with four student groups - two experimental and two control groups. At the beginning, in the middle and at the end of the course, the students were subjected to control tests. The results were statistically processed and are summarized in tables.

6.4

93. KACSUR, I.: Kutató módszer alkalmazása a biológiaoktatásban. /Using research methods in biology teaching./

A biológia tanítása, 19, 1980, No.3, pp.70-72.

The author deals with research methods and experiments in building up natural science thinking in the pupil. He refers to Verzilin, Falk, Falkenhausen, Fazekas. He points out to the recent trend in education: the quality and number of practical exercises increase. He sums up in five points the general procedure characterizing a "research experiment":

- definition of problem, development of hypotheses, introduction of experiment on agreement with the class
- experiment itself, measurements
- recording, classification of obtained results
- guiding pupils to discover links between obtained data, derivation of laws to be used in hypothesis verification
- solution of problem.

The author further mentions some important viewpoints for planning research experiments. Problem-solving means an independent and correct application of methods of natural science thinking by the pupil.

6.4

94. KACSUR, I.: Tudományos megismerő módszerek szerepe a biológiaoktatásban. /The role of scientific cognition methods in biology teaching./

A biológia tanítása, 19, 1980, No.5, pp.170-173.
4 tables.

The author deals with the scientific method of cognition and its relation to the content and methodological component of teaching. They cannot be separated, for the structure of content /of subject-matter/ determines to a certain extent also the method of teaching.

A lot of attention has been devoted lately to the structure of subject-matter. Structurization has to separate the substantial from the insubstantial. The objective is that the pupil should be able to distinguish between the principal and the inconsequential to look for the substance.

The author deals with the role of problem situations in developing the scientific method of cognition. He uses examples to present some methods aiming at the development of scientific thinking in pupils.

In conclusion, tables are included in the article with the numerical representation of the results obtained by using several teaching methods.

6.4
95. SCHIEFER, H.: Überlegungen zum schriftlichen Darstellen des Inhalts geistiger Tätigkeiten.
/Considerations on the written representation of the content of mental activities./
Biologie in der Schule, 29, 1980, No.10, pp.426-428.

The objective of the author was to initiate discussion on pupil activities. An accurate knowledge of the content of an activity also constitutes for the pupil a prerequisite for a successful meeting of requirements at an examination. Pupils must understand that it is not the same which form of written representation of an activity they will choose /this especially applies to secondary school leavers/. Activities which require developing a detailed description include depiction, explanation, clarification, justification, definition, process comparison, statistics assessment, formulation of experimental results, evaluation. Some activities only require a verbal description - enumeration of facts, examples, designation of sketches, integration, assignation, tabular comparison of structure, data on apparatus and materials used.

6.5
96. BARROW, L.H.: Close encounters of biology and reading.
The American Biology Teacher, 41, 1979, No.5, pp. 307-308.

The author suggests some measures to be taken by biology teachers to reinforce in students the ability to work with literature. First, he generally characterises four levels of reading ability, according to ZINTZE. Some tests are used to determine them.

The author further mentions some methods useful to teachers in helping pupils with the reading of a specialized text. One draws on the knowledge of affixes and suffixes taken over from Latin /such as hyper-, etc./, the other is based on analysis of sentence structure, dictionary, illustrations, order of information and the typographical arrangement of text. The author also mentions CRAIG´s method, based on the reading of entire passages and the emphasizing of main ideas. And finally, the author discusses the use of a tape-recorded text read by the students themselves.

6.5

97. DIETRICH, G.: *Übergreifende Probleme der Könnensentwicklung im mathematish-naturwissenschaftlichen Unterricht.* /Overreaching problems of developing abilities and skills in mathematics-science teaching./

Biologie in der Schule, 29, 1980, No.9, pp.353-361.

The author deals first with the objectives of developing abilities and skills /to grasp the causal laws of phenomena and processes in nature, to discover relationships and laws, to make an effective use of knowledge in practice/. The author considers as major ability comparison, identification of relationships and of the substantial, generalization and classification, analyzing and synthetizing, induction and deduction, concept formation and defining, depiction, knowledge application. Intellectual and practical abilities are also important, combined with specific skills /for example, abilities and skills of microscopical study, determination, dissection, manipulation with measuring and gauging apparatus and computers/. The implemehtation of objectives in this sphere requires the respecting of relations to polytechnical education. Work with tables, handbooks also plays an important role. The author then discusses internal relationships occurring in the formation of knowledge and skills /questions of interdisciplinary relationships/. In conclusion, the author deals with pupil activities. Out of the number of activities carried out by pupils, it is possible to select those which are important or essential for pupil development, or reflect the specific features pertaining to cognition. These are especially logical operations and observation.

6.5
98. VAN DEUREN, A.E.: Improving basic skills in the modified science classroom.

The American Biology Teacher, 41, 1979, No.8, pp. 471-474.

The author presents his experience with teaching biology in a modified science classroom. These classes are at most schools used for students who cannot cope with requirements placed on the reading of texts and the writing of papers required in a standard science class. The objective of the method developed by the author of this article is to improve student performance in the above basic skills. The teacher must, first of all, judge the suitability of a text designed for practising. There exist various tests how to find out the suitability of a text. Another criterion for selecting a textbook should be its availability. The author recommends the book by Eisman and Tanzer - "Biology and Human Progress". In classes, the pupils must get acquainted first with the correct using of the book and with some skills, such as the writing of bibliographical notes, index and vocabulary. The author mentions various methods of working with a book and the sources of suitable study materials. The author also deals with adequate student motivation, student participation in teaching and the concept of positive reinforcement based on modifying the behaviour of problem students.

6.6

99. HEINZEL, I. - RÖDIGER, W.: Kausales Denken im Biologieunterricht Erfahrungen aus den Klassenstufen 5 und 9. /Causal thinking in biology teaching - experience from 5th and 9th grades./

Biologie in der Schule, 29, 1980, No.11, pp.456-464. 8 figs., 8 tables.

Teachers endeavour to develop pupil thinking. Causal thinking represents an essential thought form. Causality is a certain relationship between cause and effect. Derivation of causal relations constitutes pupil activity during the course of which they learn the relationships existing between two or more phenomena.

Teaching is based either on a known cause and effects are sought /for example, why is it important to chew food ?/ or it is based on known effects and causes are looked for /for example, why plants die on soils with excessive fertilizers ?/. The derivation of causal relations exists in various forms /the authors mention three/ - simple cause-effect relation, causal chain and causal combination. In teaching, there also appear pre-stages of causal thinking consisting of: original thinking /using the question, what for ?/, descriptive thinking, if-then thinking, global thinking. The authors further mention various types of exercises designed for derivation of causal relations.

6.7

100. BABANSKIY, Yu. K. - PATRUSHEVA, O.I.: Optimizatsiya protsessa obucheniya biologii. /Optimization of the process of biology teaching./

Biologiya v shkole, 54, 1980, No.1, pp.23-31.

Optimization of the teaching process means the teacher's purposeful, systematic activities aimed at the selection of such tasks /objectives/, content, forms, methods and aids of teaching as will result in the maximum possible achievements of teaching, education and development of pupils with minimum time losses. The following criteria have to be observed to achieve the optimum organization of biology teaching:

1. To plan tasks /partial objectives/, in a comprehensive manner, in relation to the specificity of pupils /class/.

2. To select and specify the content of every lesson so as to comply with the expected implementation of defined objectives.
3. To select for every lesson an optimum survey of methods and material didactic aids to achieve a quality fulfilment of the objectives defined for every phase of the teaching lesson.
4. To create, in every lesson, favourable learning and material, hygienic, morally mental conditions of teaching and education.
5. To analyze systematically the results of meeting the objectives defined for a lesson together with the pupils´ and the teacher´s time losses so as to investigate the causes of inadequate acquisition of subject-matter, educational problems, overloading, etc. and to eliminate these causes in the following lessons.

These general ideas are specified and processed in tabular form in the planning of lessons to deal with the subject of "Water Intake by Roots" /8th grade/ and "Methods of Research on Human Heredity" /10th grade/.

6.7

101. BOLAY, E.: Motivation im Unterricht. /Motivation in teaching./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.4, pp.110-117.
1 fig.

Motivation in teaching plays an important role in the formation of pupil attitudes to learning. It significantly influences the teaching and educational process. The author derives first the concept of motivation on the basis of findings achieved in pedagogy and psychology and develops it with respect to biology teaching. School motivation is directly dependent on social structures which are, in turn, affected by it. Theoretical and practical relations should, with respect to motivation, be directly related to the everyday life of school. In conclusion, the author demonstrates models and experiments to be carried out by using suitable motivation. The author pays a special attention to motivation in school environment and the problem of motivation in everyday life. He includes in his article an example dealing with the subject of "Fish" to demonstrate the potential and results of motivation in teaching.

6.7

102. BUKOTINA, M.M.: Priemy aktivizatsii uchashchikhsya na urokakh biologii. /Methods of activizing pupils in biology classes./

Biologiya v shkole, 54, 1980, No.4, pp.26-29.

The achievement of maximum pupil activity throughout the lesson constitutes one of the basic prerequisites of an effective lesson. Thus, for example, when testing pupil knowledge it is effective to work with natural objects /identification of unknown plants according to identification cards of various families, observation of microscopical specimens and identification of a representative of, for example, algae, looking for identification signs, etc./ or attentive listening to the answers of examined pupils /when the examined pupil makes a mistake , other pupils try to formulate supportive questions for him or her/; it is also effective to use didactic cards with pre-formulated questions, sketches and the like. Similar procedures can be used in explanation of new material - to make use of pupils' personal experiences for preparing a paper, to make use of the results of observation and experimentation on the school garden plot and, again, a frequent use of didactic cards with precisely formulated assignments, which leads pupils to a more profound and accurate acquisition of knowledge /the author mentions three examples of these cards/.

6.7

103. CAMPBELL, R.L.: Effects of teacher training in the individualized science materials on achievement of first grade students.

Science Education, 62, 1979, No.4, pp.523-527.
3 tables.

The survey the author deals with was designed to find an answer to the following question: will the cognitive achievement of first grade students be conclusively better if the teacher has had training in the individualized science materials programme. This is a recently developed training programme laying emphasis on the summarizing assessment of a given problem. The author describes in detail the structure of the programme. The survey was carried out by means of three test types and the obtained results were statistically evaluated by using the t-test.

6.7

104. COHEN, E.L. - POPPINO, M.: CLOZE testing and study skills for college biology.

Science Education, 62, 1978, No.4, pp.443-447.

The authors report in their article on a project developed to assist those biology students who want to learn basic study skills, such as working with literature. The project was introduced at State College in Denver, Colorado, U.S.A. The students were first subjected to a test with the working title CLOZE and those who achieved at least 40% were then promoted to a course teaching study skills. The investigation the authors discuss in their article was designed to find answers to some questions which had appeared in connection with the above project /such as, whether there existed a correlation between the results of CLOZE testing and the student's achievement in the course, etc./. The authors also describe in detail CLOZE testing and the method of its evaluation; the results of the investigation are extensively discussed. In conclusion, the authors mention some recommendations with respect to the application of CLOZE testing.

6.7

105. FREY, H.D.: Methoden des individuellen Lernens. /Methods of individual learning./

Der Biologieunterricht, 16, 1980, No.4, pp.67-80. 2 tables, 8 figs.

The author describes several experiments using individual learning in biology teaching /of medical faculty students/. He bases his considerations on the studies by S.N. Postlethwaite, his "Audio-tutorial approach to learning". This method was tested by the author of this article in Cologne at the medical faculty. The method facilitates individualized learning, it is based on accumulation of various teaching aids, equipment, pictures, transparencies, tapes, video cassettes, films, slides, programmed textbooks, etc., which makes it possible for each student to pick up what suits best his or her method of learning. The method of individualized learning relieves the teacher of the routine conveying of subject-matter so that he or she is free to get engaged in direct conversation on individual questions dealing with a specific subject and problems related to it.

6.7
106. NIXON, M.: The nature of the learner: A point of view and implications for curricula.

The Australian Science Teachers Journal, 24, 1978,
No.3, pp.15-21.
1 fig.

The author deals in her article with two aspects of the human being - man as the teacher and the learner. The theory of teaching and learning is based on three main objectives: to facilitate research, to prepare a survey of contemporary knowledge and to facilitate predictions. Piaget's developmental theory has been widely used, both by educational theoreticians and teachers. Biological analogies are used here to describe developmental processes.

Piaget recognized four chronological stages from birth to maturity; a number of teaching and learning principles have been derived from this theory. In addition, Piaget´s theory is used as a point of departure for organizational procedures in curriculum development, either as the succession of individual topics, the method of content presentation or introduction of new teaching methods, etc. The author highlights in her article the main prerequisites of the teaching and learning process and sums them up into a two-dimensional schematic.

6.7

107. **PALKA, L.:** Sposoby aktywizacji uczniów w procesie nauczania i uczenia sie biologii. /Methods of activizing pupils in the process of teaching and learning biology./

Biologia w szkole. 13, 1980, No.1, pp.37-46.
3 tables.

An important component of updating the teaching and educational process in biology teaching at secondary general education school is the problem of activizing pupils. Pupil activity leads to independent work, independent learning and to mastering the knowledge of modern biology as a science. Requirements are therefore placed on pupil work getting closer to the scientific method of research and emphasis is laid especially on observation and experimentation enabling an independent study of living nature and its laws. The author discusses factors influencing pupil activization, he sees them in the suitable motivation of the teaching content, in practical activities in classes, in precise definition of objectives, adequate evaluation of pupil work, in praise and other factors affecting learning. He sees immediate motives in satisfying the pupil's inherent curiosity, justifying his own interests and predilections, getting satisfaction due to acquiring knowledge and skills for eventual practical use, for choosing a higher type of study; as regards internal factors, he mentions the relationships established between pupils, age of pupils, sex, interest of pupils, but also laziness, indifference and carelessness; as for external factors, he mentions material and organizational conditions of teaching. The author recommends to use methods facilitating pupil independent work, problem teaching, laboratory exercises, programmed teaching, work with books, pupil field exercises, direct contact with nature, pupil cooperation in planning lessons, preparation of teaching aids and equipment, collection, keeping and breeding natural objects, in defining teaching objectives, execution of observation and experimentation, creating situations requiring pupil practical activities, improving work with the book and with specialized and didactic literature, quality control of pupil independent work and its adequate evaluation, guiding pupils to self-control, individualized approach to pupils. The author includes tables summarizing a survey designed to investigate pupil activization in teaching. The material is based on 60 visitations made by four inspectors-methodologists.

6.7
108. STIEDE, E.M.: Aktivierung der Schülertätigkeit im Stoffgebiet "Hormone" Biologie Klasse 8. /Activizing pupil activities in the topic "Hormones" in 8th grade/.

Biologie in der Schule, 29, 1980, No.6, pp.233-241. 3 figs.

The author bases her considerations on the teaching and educational objectives defined for three lessons allocated to the above topic. Pupil active approach means that they should themselves contribute to the formulation of the objective of the lesson by using motivation elements. Successful teaching also relies on the use of emotional elements and activity, stimulating object and demonstration aids. The author focuses her attention on work with exercises and on the use of the school radio. In conclusion, the author reports on her personal experience with teaching.

6.7
109. STRATIYEVSKAYA, Ye.Ye.: Razvitiye poznavatelnogo interesa i navykov samostoyatelnoy deyatelnosti uchashchikhsya na uroke. /Developing the cognitive interest and habits of independent activity of pupils in the lesson./

Biologiya v shkole, 54, 1980, No.5, pp.29-32.

The author uses the example of the subject of a lesson designed for the sixth grade - Peat Moss - to demonstrate the motivating use of a poem by V. Rozhdestvensky, thus inducing a problem situation activizing pupil thought activity /they are asked to explain some verses from the biological point of view/. In a section of the lesson she uses the method of narration, in another section pupils make conclusions based on observation of the peat moss placed in water, the lesson is concluded by using the method of conversation /origin of peat/. This approach also develops intellectual aptitudes /of comparison, analysis, formulation of conclusions, etc./.

The author further uses the example of the topic "Flowering plants and their classification" /7th grade/ to illustrate the integration of interesting facts into teaching, again by using popular literature and narration. In another lesson /Adaptation of organisms and its relative nature - 9th grade/ she makes use of a film - pupils are asked to process on their own examples of adaptation of organisms to environment and to explain them. In classes where the film had been used, 10% pupils presented in a written test examples from the textbook, 60% from the film and 30% their own examples. In classes using the conventional method of presentation, the proportion was different: 48% pupils presented textbook examples, 44% examples presented by the teacher and 8% their own examples.

6.7

110. WOLFFERSDORFF, U. von: Meine Erfahrungen aus der Arbeit mit "Orientierungshilfen" für die geistige Tätigkeit. /My experience from work with guiding instructions for developing mental activities./

Biologie in der Schule, 29, 1980, No.10, pp.428-430.

A serious attention should be paid to developing activities. The author of the article has obtained the following experience in this field: both pupils and teachers require specific material that would enhance their memories in carrying out or evaluating mental activities. Pupils should be activized more. The author further reports on her work with the guiding instructions as developed by Hennig /Biology in der Schule, 28, 1979, No.7/8/. Her experience is positive. She recommends that the guiding instructions should be used in all classes and in all subjects.

6.71

111. BEIER, R.: *Leistungsermittlung - Leistungsbewertung.* /Performance testing and its evaluation./ Biologie in der Schule, 29, 1980, No.4, pp.137-139.

The author cites the second and twenty-fifth paragraphs of the school rules and discusses what pupil achievement should be evaluated /including the so-called "slight achievement/. On the basis of his personal experience, the author analyzes various suitable alternatives of obtaining information necessary to evaluate school pupil achievement by using the specific examples of individual grades of ten-year secondary comprehensive school.

6.71

112. JOHNSTONE, A.H. - MAHMOUD, N.A.: Isolating topics of high perceived difficulty in school biology.

Journal of Biological Education, 14, 1980, No.2, pp. 163-166.
3 figs.

An interesting experiment was carried out with 167 secondary school leavers. They were asked to take a stand on fifteen biological topics. They were asked to answer the following questions on each of the topics: a/ easy - immediately understood, b/ medium - I had to study it and I understand it now, c/ difficult - I had to study it, but I still do not know it, d/ I have never learned this topic. A key was determined for these answers by means of which they were evaluated and plotted into charts. The problem of osmosis and water potential in organism was most difficult both for secondary school students and for first-year college students. The author analyzes the results of the investigation, arriving at the conclusions that even teachers have difficulties with a/ osmosis and water potential in organism, b/ photosynthesis and breathing, c/ genetics, d/ developmental mechanism.

6.71

113. NOVAK, J.D.: Learning theory applied to the biology classroom.

The American Biology Teacher, 42, 1980, No.5, pp.280-285.
3 figs.

There exists a contradiction between biology as a science and the method of teaching it, based on memorizing, or as we say, cramming knowledge. The author of this article has collected material, a sort of psychological compendium, with the aim of helping biology students understand how to learn biology. He bases his considerations on the works of prominent psychologists and supplements his contribution to the learning theory by specific examples and sketches.

6.72

114. BLAKE, A.: The logical capabilities of students in science: Implications for curriculum development.

The Australian Science Teachers Journal, 24, 1978, No.3, pp.5-14.
4 tables.

The school curriculum of the late 1950's and early 1960's tended to an accurate description of some natural science laws and theories. Later in the 1960's, however, a new curriculum was developed based on the development of student formal thinking in Piagetian sense. Every new curriculum, nevertheless, should be preceded by research into student intellectual development. The author mentions in his article such a survey conducted by Blake in 1977, who measured the development of thinking in pupils of two Australian secondary schools - an urban and a rural one. The author further discusses some specific examples of difficulties pertaining to science concepts and the intellectual process. They concern the principle of conservation of mass, manipulation with dimensions and use of combinatory logic in judgement. The results of the survey indicate that the existing curriculum is mostly not in keeping with student thought level development.

6.72
115. DOUGLASS, C.B.: Making biology easier to understand. The American Biology Teacher, 41, 1979, No.5, pp. 277-281, 298.
6 figs., 2 tables.

The article describes the author's efforts to develop such a method of biology teaching as would make biology easier to understand and would reinforce student positive attitudes. As the basic step in this respect the author considers the classification of students into types thinking analytically or globally. Corresponding teaching methods should be used for these different thought processes. The first method is based on induction from typical qualities to generalization, the other on deduction documented by examples. After one year, the author subjected her draft teaching method to experimental testing. She used the form of written tests before and after the experiment. The tests consisted of specific units whose mastering was scored. The topics of the units dealt with Mendelian genetics and probability. The experimental results were then statistically evaluated by using the method of covariance analysis.

6.72
116. GARDNER, P.L.: Difficulties with illative connectives in science amongst secondary school students.

The Australian Science Teachers Journal, 24, 1978, No. 3, pp.23-30.
3 tables, 1 annex.

The author discusses a project the objective of which was to find how students coped with illative connectives in specialized science texts. Altogether 200 illative connectives were tested in the form of 25 tests, each consisting of 40 questions. The content and form of the tests were of two types. First to fourth grade students were tested at 46 schools in Victoria. The results demonstrated that the students had difficulties especially with illative connectives, for example so that, thus, therefore, etc. These connectives, however, appear quite frequently in science texts. These conclusions are in agreement with the experimental results obtained by Carroll, Davis and Richman, who analyzed school texts. This is why the author of this article focused his attention on this type of connectives also in the above described survey. Apart from a mere quantitative analysis he has also attempted to summarize the most significant causes of difficulties.

6.72
117. HERRON, J.D.: Role of learning and development: Critique of Novak's comparison of Ausubel and Piaget.

Science Education, 62, 1978, No.4, pp.593-605.

Joe Novak, editor of the journal Science Education, put forward in his article arguments against Piaget's theory of intellectual development and supported Ausubel's theory of verbal learning as the theoretical basis of pedagogical research. The author of this article does not agree with this attitude and analyzes in detail reasons why either of these two theories should carry the same weight. He deals with the question of the relative importance of motivation and learning, significance of the theory of developmental steps, relation between learning and development. In an extensive conclusion, he sums up some reflections on learning and recapitulates the main theories developed by Ausubel and Piaget. Ausubel's theory has positively contributed to research, curriculum development and classroom work. Piaget's theory can be used in developing general predictions on the selection and arrangement of content and the determination of difficulties students have in learning.

6.72
118. KAYE, J.: Inductive teaching: How, when and why.
The Australian Science Teachers Journal, 24, 1978, No.3, pp.47-53.

The author describes in her article one form of controlled learning - inductive teaching. It can be characterized by the pupil's observing specific cases leading to a deduction of a general law. The pupils thus observe the so-called primary data /real things, models, diagrams, films, experiments/. These data are usually used in the classroom to supplement the actual topic being discussed, which often diminishes pupil interest. The author suggests active pupil manipulation with primary data. She mentions a survey of possible pupil activities and teaching methods and several specific examples of inductive teaching. The first is from the field of geology and pupils work here with various rocks, minerals and soil types. Another example deals with the relation of a tone pitch to the size of a vibrating object. The author further suggests in her article a procedure to be used in case of lack of pupil interest and attempts to assess the inductive approach from the viewpoint of general theories of learning.

6.72
119. LAWSON, E.A. - ADI, H. - KARPLUS, R.: Development of correlational reasoning in secondary schools: Do biology courses make a difference ?

The American Biology Teacher, 41, 1979, No.7, pp. 420-425, 430.
4 figs., 2 tables.

The authors discuss in their article a survey conducted in secondary schools designed to investigate student capabilities of correlational reasoning. The objective of their experiment was to accumulate essential data and, on the other hand, to identify elements, contained in the curriculum, which affected the reasoning capabilities. In view of the fact that the ability of correlational reasoning plays an important role both in the solution of scientific problems and in everyday life, the authors developed two types of pictorial texts designed to determine the student level of reasoning and to determine whether secondary school biology courses make any difference with respect to the development of correlational reasoning. The first test deals with the incidence of mice with black and white tails, the other with the relation between colour and size in fish. The authors mention for both tests the characteristics of investigated subjects, the implementation of the experiment and its results.

6,72
120. LAZAROVICH, R. - HUPPERT, Y.: Developing creative thinking in secondary school biology students.

The American Biology Teacher, 42, 1980, No.4, pp. 226-227.

Secondary school biology teaching must be related to student creative thinking. To develop such an ability of creative thinking, such as to make a hypothesis, to suggest a solution of a scientific problem, an ability of divergent thinking, is important for later study at college or university. The study submitted by the authors includes the method and six categories of questions the student must process in a creative way, such as The causes of a disease - how to identify them, how to determine the possible causes of a disease, how does a disease spread, environmental conditions facilitating the development of a disease. Another category of questions deals with the physiology of disease causes, of a diseased person, etc. The authors also include a table summarizing the results of the experiment concerning student creative thinking.

6.72

121. LINN, M.C. - LEVINE, D.I.: Adolescent reasoning: Influence of question format and type of variables on ability to control variables.

Science Education, 62, 1978, No.3, pp.377-388.
3 figs., 2 tables.

The authors report in their article on an experiment designed to investigate the development of thinking in adolescents. It used three question formats - a question with a free answer, a question with a multiple-choice answer and a pictorial question. Individual types are discussed in detail in the introductory section of the article. The authors also mention the method and the actual implementation of the experiment. The subjects were asked to solve some problems, such as inclined plane, electric circuit, seed germination. A time limit was allotted to the solution of each problem, the answers were separately evaluated by two examiners. The experimental results were compared with Piaget's theory. Comparisons were also made between individual problems and correlation made between the questions.

6.72

122. RAVEN, R.J. - ADRIAN, S.M.: Relationships among science achievement, self-concept and Piaget's operative comprehension.

Science Education, 62, 1978, No.4, pp.471-479.
5 tables.

The objective of the study the article deals with was to determine the relationships among science achieveamnt, self-concept and Piaget's operative comprehension. Operative comprehension is defined as a process of creation or re-creation of information from basic received informative elements. The survey was conducted with the sample of 249 secondary school students who were subjected to three types of tests. They included some operative structures, such as classification, arrangement of objects, correlations, logical multiplication, etc. They tested achievement in working with literature, in science and mathematics, self-development of aptitudes in science and mathematics. The experimental results were statistically processed and are summarized in tables accompanied by text.

6.73
123. GUNSTONE, R.F.: Language, discussion and the learning of physics.

The Australian Science Teachers Journal, 24, 1978, No.3, pp.31-46.
7 figs.

In recent years, interest has continuously been increasing in various aspects of language used in teaching and learning, especially in the field of natural sciences. The author focused his attention on one of them in his article: the role of discussion among students. He also considers the consequences of this aspect with respect to the learning of physics. He deals with student language difficulties, the relationships between language, school curriculum and teaching in general. He presents the concept of physics teaching as conceived in Australian schools, deals with discussion as a learning method. He mentions specific examples of useful discussion materials in physics. The author comes to the conclusion that language plays an essential role in the development of concept comprehension and favours the introduction of cognitive discussion into science education. What he documents in his article by physics examples also applies to chemistry, biology, etc.

6.73

124. LYNCH, P.O.: The language of science and the Tasmanian high school child.

The Australian Science Teachers Journal, 24, 1978, No.3, pp.78-85.
2 figs., 4 tables.

The author describes in his article the results of the study of one aspect of language used in science teaching: recognition of basic definitions. In general, research into specialized language investigates various aspects: quality of written and verbal expression, investigation of vocabulary and sentence structure. The above study is based on the determination of the so-called "basic words", in this case in the language of science. The objective of the experiment was to determine secondary student capabilities of recognizing simple definitions of basic words and to determine the influence of some factors, such as sex, I.Q. /verbal expression/, socio-economic status of parents, age and level of the general score achieved in the test. As a topic, the researchers chose a unit commonly used in Australian secondary schools - "Nature of Matter". Sixteen basic words were chosen for the questionnaire dealing with this subject. The students completed the questionnaire based on the multiple-choice answer method. The results were statistically processed and summarized in tables and charts. The author deals in his article with individual ranges of questions - quantity and dimensions of mass, physical form or state, nature of constituent elements, nature of particles and structure of atom. He also briefly deals with the effects of investigated factors. He arrives at an interesting conclusion, i.e. that the standard of knowledge of basic concepts does not always correspond with expectations, not even among talented students.

6.73
125. LYNCH, P.P. - PATERSON, R.E.: Scientific language and the high school pupil.

The Australian Science Teachers Journal, 25, 1979,
No.1, pp.66-73.
1 fig., 2 tables.

The author deals in his article with the problem of the effects of sex on pupil capabilities. In the introductory section he mentions some investigations dealing with this subject, for example Maccoby and Jacklin /1974/, Walberg /1969/, Flanagan /1961/ and others. In view of the fact that spoken word is one of the most important teaching media, the author focused his attention on language used in science teaching, especially on student difficulties concerning the recognition of basic definitions. The objective of the above investigation was to determine the effects of sex on the recognition of simple definitions of key words in science. The written test consisted of a set of 16 key words dealing with the topic of "nature of mass". The students underlined one of several possible answers. The key words were grouped into five ranges /quantity and dimensions, physical form or state, nature of constituent elements, nature of particles, structure of atom/ which were then separately processed. Statistical evaluation was carried out by means of an X^2-test and the results were represented graphically.

6.73

126. PREECE, P.F.W.: Exploration of semantic space: Review of research on the organization of scientific concepts in semantic memory.

Science Education, 62, 1978, No.4, pp.547-562.

The author discusses theoretically the problem of scientific concepts in semantic memory. He compares first various methods of teaching word meaning - those using other known words or the so-called demonstrative methods which do not do it. A considerable section of the article is devoted to the mapping of the cognitive structure. The maps are based on semantic differences between concepts. There exist spatial, hierarchic and graphical maps; the author mentions the relationships prevailing among them. The major subject of the article is the organization of scientific concepts in semantic memory. The spatial type of map was used in this case. The author further compares cognitive and subject structures and discusses in detail the demonstrative concept. In conclusion, he briefly sums up the entire problem.

6.73

127. QUORN, K.CH. - YORE, D.: Comparison studies of reading readiness skills acquisition by different methods: Formal reading readiness program, informal reading readiness program, and a Kindergarten science program.

Science Education, 62, 1978, No.4, pp.459-465.
2 tables.

The authors report on the comparison studies designed to investigate the effectiveness of two different programmes - SAPA and the Initial Spoken Alphabet /ISA/ - designed for reading readiness skills acquisition by kindergarten children. The variable quantity - reading readiness skill - was measured by means of the Metropolitan readiness skills test, Clymer-Barrett pre-reading system and their subtests. Independent variables - handling, sex and time spent in kindergarten - were expressed as dichotomous categories. The researchers investigated 51 children divided into four groups. They also compared the effects of four different programmes /SAPA, ISA, informal reading readiness programme and control/ on reading readiness skills acquisition by preschool children.

6.74

128. BISHOP, J.A.: The dynamics of the Liverpool taxi-cab population: 1971-1978.

Journal of Biological Education, 13, 1979, No.3, pp. 192-194.
1 fig., 2 tables.

The article partly draws on the work by Bishop and Bradley, published in the Journal of Biological Education in the year 1972, in which the authors reported on the possibility of making use of the taxi-cab population as a teaching model. The advantage of this "population" is that the calculated results can be verified precisely by the number of issued licence. By 1978, the number of registered taxi-cabs in Liverpool had increased from 300 /in 1971/ to 900. This phenomenon can be used in ecology lessons to demonstrate population growth and the methods used in population studies. From among possible subjects, the author describes in greater detail the estimate of the age composition of a population and other parameters by using Jolly's method. The results were statistically processed and summarized both in tables and in a chart.

6.74

129. COHEN, N.C.: Lebemo: a situation on game in bacterial genetics.

Journal of Biological Education, 14, 1980, No.4, pp. 293-298.
2 figs.

The author, biology lecturer at university, recommends simulation games as an important factor for training perception and acquiring experience by students. The objective is that those participating in the game, students, should tackle problems simulating "real life", i.e. should analyze situations and determine a plan of strategies leading to a solution. The author deals in detail with the structure and content of a game dealing in this case with bacterial genetics. The game system can, of course, be also applied to other cases of biological problems.

6.74

130. GÄRTNER, H.: Spielverhalten bei Tieren - ethologische Unterrichtsmodelle für die Klassen 4 - 6. /Play as behaviour phenomenon in animals - ethological teaching models for fourth to sixth grades./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.5, pp.142-151.
4 worksheets, 1 table.

The author discusses the problem of behaviour, demonstrated on animal play /but also children's play/ from the viewpoint of specialized science - ethology and education. The lesson developed for this topic is structured on the basis of the pattern biology-society-pupil. It is designed to make use of knowledge pupils acquire out of school. There exists some agreement between the play of animals and children, and naturally also differences. In both, however, play is preparation for future serious situations. The author studied the curiosity and play of pupils, causes and characteristics of play, forms and types of play, specific conditions of play, motion play, hunting and fighting play, escape play, prey-hunting and food-gathering play, play dealing with the problem of reproduction and care of offspring, experimental play. The author suggests for school teaching that pupils should be acquainted with the play of prey-hunting of young cats, play at escape and chase of dogs, play at attack and fight of lions, motion and experimental play of young gorillas. He demonstrates how to deal with this topic in lessons designed for fourth to sixth grades. He recommends for pupils free play, role-playing and play with rules.

6.74

131. HILL, D.M. - THOMAS, P.J.: Developing the concept of a model.

Australian Science Teachers Journal, 24, 1978, No.1, pp.91-94.
6 figs.

Modelling constitutes an essential part of science research /the model of atom can be used as an example/. Models facilitate explanation and observation and are a starting point for further study. Although science models are mental rather than physical, when teaching in lower grades it is necessary to work with specific models, not abstract ones. The authors present in their article instructions how to make and use several models. In their opinions, it is necessary to start with making and using models as early as the age of five. They describe one of such early models, "a feeling bag", containing various objects children are asked to guess. Other models include a tin box containing various geometrical figures, a simple labyrinth with a moving marble, and some more models are described, serving for more complex tasks.

6.74

132. JOHNSTONE, A.H. - MAHMOUD, N.A.: Pupil's problems with water potential.

Journal of Biological Education, 14, 1980, No.4, pp. 325-328.
2 figs.

Secondary school students often have difficulties with grasping the problem of water potential in organisms. The authors of this article have developed a tabular model consisting of 10 tables demonstrating clearly the entire process of water potential and the effects of the individual phases of water circulation. Prior to developing it, they subjected to oral interviews and written tests groups of students and on the basis of an analysis of their problems with water potential they drew up their summarizing study to make easier the understanding of this topic.

6.74

133. KATTMANN, U.: Das homöstatisch gesicherte Fliessgewicht zur kybernetischen Beschreibung von Biosystemen. Teil. 2. /Homeostatically maintained dynamic equilibrium concerning cybernetic representation of biosystems. Part 2./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.6, pp.359-366.

In the introductory section of his article the author describes dynamic equilibrium and compares it with homeostasis. In the following section, he deals with regulatory processes in organisms whose dynamic equilibrium is subordinated to regulatory homeostatic mechanisms, the so-called homeostatic safeguards of dynamic equilibrium. The author discusses the problem of regulation of dynamic systems and demonstrates it on a block diagram of simple dynamic equilibrium, homeostatically safeguarded dynamic equilibrium, on controlling the temperature in a room and on controlling the temperature of a person.

6.74

134. RAVEN, R.J. - COLE, R.: Relationships between Piaget's operative comprehensions and physiology modeling processes of community college students.

Science Education, 62, 1979, No.4, pp.481-489.
5 tables.

The objective of the study the article discusses was to investigate the relationships existing between the levels of comprehension and modelling among students. In modelling, they distinguished the graphical, formal and mixed levels. The study was conducted in physiology-oriented classes. The nine modules that were used included subjects such as osmosis, transportation transfer systems, nervous control mechanisms, gas exchange through breathing diaphgrams, circulation of fluid among plasma through tissues, factors determining blood pressure, urea formation, equilibrium between acidic and alkaline environment. A preliminary test was done first with all the student subjects, followed by the module application and a control test done afterwards, whose results were statistically processed.

6.74

135. RÖLL, K.: Mathematische Modelle in der Populationsgenetik. Teil I: Ungestörte Populationen: Hardy-Weinberg Gesetz. /Mathematical models in population genetics. Part I: Undisturbed populations; Hardy-Weinberg law./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.9, pp.265-270.
5 tables.

The distribution of genotype and phenotype in a population can be explained by elementary rules of the probability law, based on the frequency and incidence of genes. Mutual relationships prevailing in population genetics can be studied on models and transferred to real biological conditions. The author demonstrates on typical examples how to calculate the distribution of genes in a natural, undisturbed population. He deals in greater detail and specifically with the distribution of blood groups in a population.

6.74

136. SHONE, J.: Determining the primary structure of an oligopeptide - a computer simulation.

Journal of Biological Education, 13, 1979, No.2, pp. 123-126.
1 table, 1 fig., 1 annex.

The author describes in his article the BASIC computer programme enabling senior secondary school students to study the arrangement of amino acids in any oligopeptide. A model simulates a time-consuming and relatively risky process, which makes it possible for students to obtain first-hand data and to determine experimentally the primary structures of a macromolecule. In the BASIC programme, the oligopeptide is encoded as a chain or a list of maximum 21 letters; each corresponds to one amino acid. Supplementary data and designation is taken over from the ISHPOLY programme and are indicated in a table. In addition to a detailed description the BASIC programme, the author also discusses the alternatives of its use. In the annex to the article, the author describes an application example of the programme to determine the order of eight amino acids.

6.74

137. SVIDERSKAYA, M.D. - VINOGRADOVA, A.D.: Opyt primeneniya igrovykh situatsiy v prirodookhranitelnom prosveshcheniyi shkolnikov. /Experience with using game situations in the environmental education of pupils./

Biologiya v shkole, 54, 1980, No.5, pp.70-72.

Situation games have recently been introduced into the theory of ecological education, acquainting pupils with the specific conditions of everyday life. The collective nature of the games, their emotional effects and also necessity requiring from each student that he should actively participate in the role of a "specialist" dealing with a specific partial problem, all this leads to positive results, including a formation of an active citizen attitude to nature conservation. The authors present a shortened record of such a "press conference" dealing with the topic of "Protection and rational use of plant and animal species of Leningrad district". The game was conducted with ninth graders at the end of the school year. The objective was to demonstrate pupil complex knowledge of environmental protection problems, while specifying knowledge of populations, species, origin of species, evolutionary factors, etc. and also respecting regional specificities of nature protection. The results are interesting and stimulating.

6.74

138. SWINBURNE, D.R.: Monte Carlo kinetics.

The Australian Science Teachers Journal, 24, 1978, No. 3, pp.117-122.
5 figs., 1 table.

The author discusses in his article an interesting method of teaching some kinetics laws, called "Monte Carlo". The method simulates random phenomena in a way which makes it possible for students to imagine the course of the reaction on a molecular scale. The author focused his attention on reactions of gaseous states, whose mechanisms lie either in the succession of two basic processes, disintegration of one molecule or collision of two molecules. The Monte Carlo simlation method is based on the substitution of molecules by letters or signs, arrayed in a grid. The above technique was originally developed as an aid for analysis of the ratios of complex nuclear reactions. The author describes in detail how to use the Monte Carlo method. For easy computation, the grid is divided into 10 rows and 10 columns so that, for example, even with the disintegration of molecule "A" into "B" and with 100 M initial solution, the letter A will be in each field. It is used to computate the course of disintegration in dependence on time and temperature; the same dependencies are also observed in other reaction types.

6.74
139. ZAMPELLA, R.A.: A Simulated Stream Ecology Study.
The American Biology Teacher, 41, 1979, No.5, pp. 293-294, 297.
5 figs.

The author describes a subject recommended for ecology laboratory exercises, designed especially for teaching in urban schools. The author of the article mentions his personal experience with the topic "Water Stream Ecology"; he himself has contributed to its development. The simulated situation was developed on the basis of preceding field survey attended by over 400 secondary school students. The survey, i.e. also the model, consisted of several basic sections - investigation of the community of benthic invertebrates and algae, and analysis of the food chain. The students had an opportunity to acquire knowledge in the field of classification of living organisms, they learned to describe the incidence of invertebrates in relation to the chemical and physical characteristics of their environmeht, they drew up food chains, recorded data on the characteristics of the water stream, etc.

6.74
140. ZIPKO, S.J.: A model for the study of population dynamics.
The American Biology Teacher, 41, 1979, No.5, pp. 282-288, 299.
12 figs.

The author describes in his article a simple reference model designed to demonstrate the basic principles of population ecology, such as the yearly circulation, compensation, etc. It is actually a wide-neck plastic bottle with a screw-on enclosure. A schematic of factors affecting population dynamics and a schematic of the characteristics of a specific population are glued all over the surface of the bottle. The author describes the method of working with the model and also describes in detail an instruction how to make it. In addition to its general uses, the author also mentions procedures to be used in demonstrating individual laws. In conclusion, the author mentions the evaluation of the model both by students and teachers.

6.8
141. GILBERT, J.H. - OSBORNE, R.D.: I understand, but I don´t get it: Some problems of learning science.
The School Science Review, 61, 1980, No.216, pp. 664-674.

Science education, in the authors´ opinion, should be started as early as first classes of primary school. They are of the opinion that children should be presented with explanations of concepts, initially the very simple ones, such as - a fire burns, a nettle stings, a gun fires, a wound smarts, the sun burns and many others - to teach them to recognize as early as this age. The authors developed a method of procedures to be used in this kind of teaching, including an explanation of the concepts of work, to work, activity, etc. finishing up with some biological and physical concepts.

6.8

142. MAREK, E.A. - RENNER, J.W.: Intellectual development, IQ, achievement, and teaching methodology.

The American Biology Teacher, 41, 1979, No.3, pp. 145-150.
2 figs., 1 table.

IQ testing has for a long time been used to predict a pupil's future study achievement. Since there exists a positive relationship between IQ and intellectual development, the measurement of this development can be useful in assessing pupil achievement. The authors report in their article on an investigation designed to find the relationship existing between the above described three factors /IQ, intellectual development and achievement/ and the so-called "questionnaire-through-teaching method" they have used in their classes. Their teaching methodology is based on the programme developed in 1974 by the researchers of the Regional Educational Laboratories. Its specific objectives include the acquisition of research skills /formulation of hypothesis, work with literature, interpretation of data, etc./, acquisition of social experience /communication, social interaction, public appearance/, factual content /knowledge of biological principles, concept of ecology, bioenergy, etc./ and reinforcement of attitude /responsibility, openess, satisfaction/.

6.8

143. MOORE, J.A.: *Dealing with controversy: A challenge to the universities.*

The American Biology Teacher, 41, 1979, No.9, pp. 544-547, 551.

The author deals in his article with the problem of teaching some controversial questions in biology. He states that, even with the independent interpretation of subjects, some problems /such as sex education/ are neglected in textbooks at all school levels. He mentions as a specific example the question of teaching evolutionary and creationistic ideas: while in the 1920's creationists asked for the elimination of evolutionary topics from the curriculum, they are asking today for both these theories of the origin of life to be represented equally in the curriculum. In view of the fact that the substance of the controversy between both schools of thought is not scientific, but political, it is very difficult to cope with it in teaching. The author suggests some alternatives for teachers how to cope with the problem. In the author's opinion, it would be especially effective to start dealing with the controversial problem at universities.

6.81

144. BECKSKEHÁZI, A.: *A mennyiségnek minőségbe átcsapásának törvénye és megfordítva.* /The law of transformation of quantity into quality and vice versa./

A biológia tanítása, 19, 1980, No.4, pp.108-109.

This is a contribution to the article entitled

"Qualitative-quantitative changes in teaching biology at primary school", published in the first issue of this volume of the journal. It positively evaluates the efforts to make a good use of the potential of dialectics in biology, yet there are also several critical comments on the examples presented in the above article. In his criticism,the author refers to following literature: F. Engels: Dialectics of Nature, M. Varró Rózsa: Dialectics in Living Nature.

6.61

145. HEINZEL, I.: Erziehung und Biologieunterricht.
/Educational and biology teaching./

Biologie in der Schule, 29, 1980, No.9, pp.362-370.
1 fig., 9 tables.

The author tries to find an answer to the question why the efforts to educate pupils are not quite successful. Education should be based on conviction, which requires adequate knowledge and comprehension. These, however, are not fully satisfactory conditions, for it is also necessary to include into them the effects of the mental state of pupils, the real situation, the personal experience of pupils, motivation and authority. The author further deals with research designed to investigate the knowledge necessary to build up conviction and the effects prevailing here, either positive or negative. The survey was conducted in the sixth, eight and tenth grades by means of a questionnaire.

6.81

146. HUTH, W. - HAUSCHILD, G. - NAUMBERGER, L. - ROSSA, E.: Wie erreichen wir hohe weltanschauliche Wirksamkeit des Unterrichts ? /Teil 1/. /How can we achieve a high effectivity of world outlook formation in teaching ? Part I./
Biologie in der Schule, 29, 1980, No.4, pp.129-137.

The authors base their considerations on the theory that world outlook education must shape up the thinking, emotions, will and behaviour of pupils. They analyze first the prerequisites necessary to achieve the objective: knowledge of facts, concepts, laws and theories, methods and procedures of knowledge acquisition, methods making use of facts and differences between socialism and capitalism. They further deal with the psychological substance of persuasion and suggest a method to be used: 1. teaching topic, 2. time of using it, 3. objective and methodological considerations, 4. discussion of a world outlook problem, 5. questions, opinions, conception, 6. references for those interested in the problem.

6.81

147. KACZIBA, L.: Világnézeti nevelés a munkáltatás folyamatában. /World outlook education in practical exercises./
A biológia tanítása, 19, 1980, No.6, pp.174-178.
2 figs.

The author characterizes the practical exercises: the role of the teacher /controlling/ and the role of the pupil /independent, creative activity/, the aids to be used /work exercise-book, textbook/. She lays emphasis on the educational aspects of the exercises, especially the world outlook education, stemming from the scientific character of biology. By means of acquired knowledge, pupils are able to form a view of the surrounding world. With the increasing quantity of scientific knowledge in pupils, they are able to discover more and more the relationships prevailing in nature. The pupil's world outlook assumes a scientific nature, he begins to understand the dialectics of nature. In the following section of her article the author describes the course of one exercise designed to deal with the specific topic of Domestic Fly, Diadem Spider and Cock-Chafer.

6.81

148. KOZLOVA, T.A.: Iz opyta izucheniya leninskogo nasle-diya na urokakh biologii v 8. klasse. /Discussing the experience with studying the Leninist heritage in biology classes in the eighth grade./

Biologiya v shkole, 54, 1980, No.2, pp.32-35.

The author, biology teacher in Gorki, mentions in her article some specific examples of working with the Leninist heritage in teaching anatomy, physiology and human hygiene. Even the introductory lesson dealing with the topic can be used to point out to the important role V.I.Lenin played in the development of the Soviet system of health service. It is possible to use the topic of "The motor and supportive system" to specify the ideas of the Programme of the Communist Party of the Soviet Union concerning the harmonious development of the young man, especially in relation to the development of physical education in the U.S.S.R. Pupils who have become acquainted with the principles of the implementation of the Leninist heritage in the U.S.S.R. can make a good use of their knowledge also in their work as the leaders of Young Pioneer groups.

6.81

149. PROKHOROV, A.O.: Sovershenstvovat ideyno-politicheskoye vospitaniye uchashchikhsya. /To pervect the ideological and political education of pupils./

Biologiya v shkole, 54, 1980, No.5, pp.3-6.

The author characterizes the tasks the Soviet school faces at the time of preparation for the XXVIth Congress of the Communist Party of the Soviet Union and stresses the necessity of mobilizing reserves, especially in generalizing the experience of prominent teachers with the formation of ideological and moral characteristics of the personality of a citizen of the socialist society, with the laying of the foundations for the scientific dialectic-materialistic world outlook and the Marxist-Leninist methodology of cognition. The knowledge acquired in biology education will make it possible for pupils not only to form an image of the diversity and development of the organic world, but also to grasp the importance of this knowledge with respect to the solving of specific questions concerning the development of industry and agriculture, nature protection, medicine, health service, and other branches of the national economy. The acquired knowledge will also play a significant role as a foundation for pupils' scientific-atheistic active approach to the religious and idealistic concepts of the origin and existence of life.

6.81

150. REBROVA, D.V.: K izucheniya leninskogo naslediya v protsesse prepodavaniya biologii i vo vneklassnoy rabote. /On the study of the Leninist heritage in the process of biology teaching and in extra-curricular work./

Biologiya v shkole, 54R, 1980, No.2, pp.25-31

The resolution of the Central Committee of the Communist Party of the Soviet Union "On the 110th Anniversary of V.I.Lenin's Birth" has become the methodological foundation for teacher work with pupils in studying the theoretical Leninist heritage. Each topic can be studied with respect to several aspects:

1. by laying emphasis on V.I.Lenin's personal contribution to the problem;
2. by getting pupils acquainted with V.I.Lenin's works, decrees and historical documents related to the problem;
3. by pointing out to the way Leninist ideas are being implemented in the U.S.S.R.

The author mentions further how these aspects can be used to analyze some questions of Leninist agrarian policy and the importance of Leninist ideas in the sphere of nature protection and rational uses of its resources and reserves. The teacher can, in view of the prevailing circumstances, decide in what lessons or extra-curricular activities it will be best to to deal with these questions.

6.81

151. SCHUBERT, U.: Zur Auseinandersetzung mit idealistischen und dualistischen Auffassungen in den Neurowissenschaften. /On the controversy concerning the idealistic and dualistic concepts in neurosciences./

Biologie in der Schule, 29, 1980, No.6, pp.225-230.

The psychophysiological problem is one of the oldest problems both natural scientists and psychologists have been dealing with. The physical embraces all structures and processes up to the molecular structure of the nervous system and the brain. The mental constitutes processes and phenomena such as thinking, consciousness, perceptions, sensations, images. Materialistic philosophy conceives the mental both as a thought phenomenon and a function, or a quality of the nervous system. The effort to conceive both aspects in a relationship meets with difficulties. The mental is always linked with the material process, therefore it has to be conceived from the standpoint of materialistic monism. In idealistic monism the mental and the physical are one, in dualism they are separated and constitute two mutually independent worlds.
Marx, Engels and Lenin took the monistic approach to problems, which is documented by the author of this article on their works. He further deals with some modern phenomena of dualism, as conceived by, for example, the philosopher K. Popper and the neurophysiologist J. Eccles. They based their theories on positivism and the existence of three worlds and they arrived at the dualism of the spirit and the body. In conclusion, the author presents arguments against dualistic, pseudoscientific opinions.

6.81

152. SMIRNOV, I.N.: *Leninskaya kontseptsiya razvitiya i sovremennaya teoriya evolutsii.* /The Leninist concept of development and the contemporary theory of evolution./

Biologiya v shkole, 54, 1980, No.2, pp.8-15.

V.I.Lenin contributed significantly also to the developing of philosophical ideas, which for a long time to come will positively affect scientific progress in science and humanities. If in the course of formation of the materialistic concept of development an important role was played by the theories of Ch. Darwin, the subsequent development of the evolutionary theory has taken place to a great extent thanks to the methodology based on the experimental and theoretical work of both the advocates and opponents of Darwinism. The knowledge of the Leninist concept of development helps scientists understand the important role played by dialectical materialism in the study of organic evolution and to grasp fully and make a full use of its approaches. Lenin focused his attention on the problems concerning the dialectics of development, for example, in his fragment "On the Question of Dialectics" in his Philosophical Notebooks. In it, he put into opposition the metaphysical and dialectical concepts of development. The dialectical concept of development concentrates main attention on the comprehension of the source of "self-movement" as a unit and struggle of contradictions. It is only the dialectic concept that presents a key to the comprehension of "leaps", "disruption of succession", "changes to their opposite", to the extinction of the old and the origin of the new.

A number of authors in the U.S.S.R. have developed questions concerning the evolutionary theory, based on the methodology of the Leninist concept of development. They have presented data documenting the victory of the theory of natural selection and pointed out to its significance with respect to the comprehension and development of Darwin's evolutionary theory /N.I. Vavilov, V.N. Sukachev, D.K. Belyayev, N.P. Dubinin, M.M. Kamshikov, V.S. Kirpichnikov, Ye.I. Lukin, A.L. Takhtadzhyan, A.V. Yablokov, and others/. The Leninist concept of development is also helpful as a methodological basis for the correct interpretation of facts of many science disciplines /including the penetration of cybernetics, information theory, mathematization of science/ and for the developing of the evolutionary theory.

6.81

153. STÖHR, H.J.: Die dialektische Widersprüchlichkeit des Vererbungsmechanismus und ihre Darstellung aus logisch-historischer Sicht. /The dialectic contradiction of the hereditary mechanism and its representation from the logical and historical viewpoints./
Biologie in der Schule, 29, 1980, No.12, pp.504-507.

The author deals first with the significance of heredity. To maintain the continuity of genetic structure is important and necessary for the existence of life. Genetic information, however, is only relatively constant, for it is affected by mutations. It is possible to learn the principle of the dialectical contradiction of heredity only by respecting the logical and historical method. The mechanism of heredity is subject to evolutionary changes, it perfects itself. The contradiction of heredity and mutations can be pointed out to pupils as early as the ninth grade.

6.81

154. STRELNIKOV, V.M.: Leninskim kursom. /Taking the Leninist course./

Biologiya v shkole, 54, 1980, No.2, pp.4-7.

The author, in discussing the resolution of the Central Committee of the Communist Party of the Soviet Union, entitled "On the 110th anniversary of V.I. Lenin's birth", lays emphasis not only on the historical significance of Lenin's work and ideas, but also their importance for the present. On the basis of their knowledge, biology teachers build up in their pupils the Marxist-Leninist materialistic world outlook, Communist conviction, they foster in them a love of agriculture, a pride of workers engaged both in agricultural science and practice. In relation to the preparations of the celebrations of the 110th anniversary of V.I.Lenin's birth, scientific and practical conferences were convened, as well as pedagogical readings, which culminated in the IVth All-Union Conference in Kazan. They also contributed to the activizing of the work of school Lenin museums, halls, rooms.

6.81
155. VOGEL, C. - VOGEL, F.: Gefährliches Gedankengut in einem Rundschreiben an Lehrer und Erzieher. /Dangerous ideas in the circular letter for teachers and educators./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.4, pp.126-127.

The acting chairman of the Society for Anthropology and Human Genetics, C. Vogel, and the chairman of the Society, F. Vogel, protest against a circular letter issued for teachers and educators in the German Federal Republic and circulated by the Society for Anthropology, Eugenics and Behaviour Research. The circular misuses the findings of the modern sciences of anthropology and genetics and distorts them and encourages racialism in the spirit of the Nazi ideology, incorrectly interprets human races, intelligence and human behaviour. The authors of this article analyze the content of the circular letter and point out to the fascist attitudes of its authors and warn teachers and educators against this pamphlet.

6.82
156. CALLAGHAN, C.A.: Evolution and creationist arguments.

The American Biology Teacher, 42, 1980, No.7, pp.422-425, 427.

The author opposes from a scientific standpoint the creationist arguments based on biblical interpretation. Against the creationist arguments she puts forward scientific arguemnts and in twenty chapters verifies the validity of the developmental theory by using geology, radiometry, anthropology, linguistics, etc. The article can be put to a good use in biology teaching for its specific arguments, clearly formulated, therefore accessible to young students.

6.82
157. SMIRNOVA, L.N.: Ateisticheskoye vospitaniye vo vneklassnoy rabote. /Atheistic education in extra-curricular work./

Biologiya v shkole, 54, 1980, No.2, pp.47-50.

The author recalls V.I.Lenin's ideas on atheism and religion, related especially to the decree issued by the Council of People's Commissars on 20th January 1918 on the separation of Church from State and school from Church. She refers to the necessity to integrate systematically and organically scientific-atheistic work in schools into the unified teaching and educational process. Out-of-school activities are organized in close coordination with atheistic education implemented in classes. The situation prevailing in families is studied by teachers of junior grades by means of questionnaires, in senior grades pupils prepare papers dealing with various complex questions related to atheistic education. An effective medium of atheistic education are evenings organized to discuss atheistic topics, excursions to the planetarium and to the House of Scientific Atheism, as well as weekly projections of selected films, especially with anti-religious subjects.

6.84

158. ARNAUDOVA, S.: *Realizatsiya na biologichnite znaniya v trudovoto obucheniya na uchenitsite.* /Applying pupils´ biological knowledge in work education./ Biologiya i khimiya, 23, 1980, No.2, pp.35-39.

One of the important objectives of present-day school is work education and pupil vocational guidance. These tasks can be implemented only through a close cooperation between school and industry. The acquisition of basic scientific principles on which production is based leads to polytechnical education.

The author describes how she makes use of pupils´ biological knowledge begining with seventh and eighth grades to apply polytechnical elements to work in an agricultural enterprise. She even organizes some biology lessons in the field, such as a zoology lesson dealing with the topic of Ungulata, or practical exercise lessons in the seventh grade - Rabbit Breeding.

Even in their voluntary work pupils are evaluated with respect to their endeavour, activity, sense of responsibility, work completed, etc.

Work in the biological hobby club also contributes to the vocational guidance of pupils; even here the biology teacher tries to harmonize her pedagogical work with the work of the agricultural enterprise collective. Emphasis is laid on economic aspects, mechanization, specialization, modernization to demonstrate to young people the prospects of the industry and their possible integration into its productive work.

6.84
159. GOMBÁR, GY.: A munkára nevelés lehetősége a biológia tanításában. /The potential of work education in biology teaching./

A biológia tanítása, 19, 1980, No.5, pp.174-175.

The author discusses education to independence and to development of individual abilities. Joy of work cannot be explained, pupils have to experience it themselves, through independent work. The results of the work will depend on the pupil's preparation for a specific work activity. This is the moment when the pupil should become committed, should try to achieve the best possible results and he or she should also prepare for the activity in the best possible way. The author uses some specific examples to demonstrate how, through an educator's purposeful and consistent work, it is possible to educate pupils with responsible attitudes to work; she also points out to the important role played by this educational sphere.

6.84
160. MOLITOR, T.E.: Career education: Toward a larger view.

The Science Teacher, 47, 1980, No.5, pp.29-30.
6 figs.

The decisive role of the teacher and the advantages of career education constitute the subject of this article written by a chemistry teacher who projects his experience into specific educational objectives and defines the principles of this progressive pedagogical medium which contributes to pupils' quick adaptation to practical life.

6.84

161. NAUMOVA, A.N.: Iz opyta trudovogo vospitaniya selskikh shkolnikov. /Experience with career education of rural pupils./

Biologiya v shkole, 54, 1980, No.2, pp.55-56.

On the occasion of the 20th anniversary of the founding of the pupils' voluntary work team of Karavayevsk secondary school in Kostrom region, the author presents a survey of the activities and experience of the team. It was founded on the basis of the law enforced on 24th December 1958 on the reinforcement of the linking of school to life and on the further development of the system of popular education in the U.S.S.R., when a 200 ha plot of agricultural land was allocated to the school. Gradually, the voluntary work team has developed agricultural experimentation on a section of the plot. The team has been rewarded by many awards for its achievements. In the course of twenty years, 3.600 pupils have taken part in these activities, many of them have obtained the qualifications of tractor drivers, laboratory assistants-agricultural chemists, machine operators in animal husbandry, etc., and 347 pupils continued their study in agricultural college. As to the specific organization of experimental work, the author refers readers to Biologiya v shkole, 1977, No.4, p.70 and 1978, No.1, p.65.

6.85
162. DEMIRCHEVA, Kh. - STAVREVA, G.: Povishavane efektivnosta na uroka po biologiya v 5. a 6. kl. chrez ispolzuvane na profesionalna informatsiya. /Increasing the effectiveness of biology classes in the fifth and sixth grades by using professional information./

Biologiya i khimiya, 23, 1980, No.2, pp.45-49.

The new curriculum of biology for the fifth and sixth grades includes subject-matter designed to demonstrate summarily the development of the biological sciences. This is facilitated by the polytechnical approach and the presentation of professional information.

Emphasis is laid on ecological, evolutionary and polytechnical principles. The authors demonstrate how these aspects are applied to individual topics, such as the creation of fruit and seeds, plant protection, children's roundworms, etc.

Experimental results confirm that pupils should not acquire only basic facts and knowledge, but that they should also grasp their importance for the solving of specific real-life and classroom situations.

6.85
163. KAMBAROV, A. - SIMONYAN, O.P.: Formirovanie u shkolnikov prakticheskikh umeniy po ispolzovaniyu znaniy kursa botaniki. /Formation of practical skills by making use of botanical knowledge./

Biologiya v shkole, 54, 1980, No.6, pp.48-49.

The authors made comparisons of pupils' preparedness for the specific conditions of work prevailing in the agriculture of Armenia. In an experimental class, they carried out supplementary exercises and problems dealing with locally accessible plants, their applications on a school garden plot and in agriculture. Examples highlighting local conditions prevailing in agricultural production did, indeed, influence the raising of the polytechnical significance of knowledge and skills and vocational guidance.

6.85

164. MAY, B.F. - STUART, A.N. - PRICHETT, M.- JONES, A.V.: Gypsum: A school-industry science project.

The School Science Review, 11, 1980, No.216, pp. 405-417.
4 figs.

The author presents an example of polytechnical education demonstrated on the practical object of a gypsum mine and the processing equipment. It is combined with several practical experiments showing the technological processing of gypsum. The method described in the article can also be applied, for example, to limestone or other types of industrially exploited minerals. In this way, students will get acquainted with an industry whose basic production technology they have not come across yet.

6.86

165. LAZAROVA, M.: Esteticheskoto vazpitaniye na uchenitsite chrez obucheniyeto po biologiya. /Aesthetic education of pupils in biology classes./

Biologiya i khimiya, 23, 1980, No.5, pp.29-32.

The author demonstrates how to combine biology classes with the aesthetic education of pupils, by using the topic of Singing Birds.

The lesson begins by identification of birds from pictures, classification of characteristics pertaining to individual groups, among them singing birds. As their most important characteristic it is possible to identify the existence of the syrinx. Even individual species belonging to this group can be identified by their singing the way they sing.

The teacher uses a tape with the recorded voices of different birds. Pupils listen to the voices, recognize and evaluate their melody and pitch.

The lesson will be concluded by listening to the "Children's Symphony" by Khajda.

6.86

166. TROMMER, G.: Kalender werben in Klassenräumen. /Calendars promote nature in classrooms./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.8, p.250.

The author reports on the use of wall calendars in biology classes. The colour and black-and-white photographs of wall calendars can be used as material for notice board and promotional applications in biology and zoology teaching. The photographs can be used in teaching also in the tackling of educational problems. Calendars offer material to promote environmental protection, protection of plants and animals, and the like.

6.87
167. **ALLEN, R.F. - Le HART, D.E.:** Environmental /energy education. An ethical perspective.

The American Biology Teacher, 41, 1979, No.6, pp. 349-352, 353.
1 fig.

The authors discuss in their article the ethical perspective of the problem of energy resources. In their opinions, it is necessary to educate pupils to form positive attitudes to environment. They state the examples of the opinions of some authors concerning the basic questions of life /A. Lovin, F. Kluckholm, Allen et al./. They discuss the question of the ethical perspectives of an individual and a social group. They define the main objectives of education to deal with the environmental/energy problem. This education should develop the strength of personality, responsibility of an individual, his or her moral sensitivity, it should differentiate between the knowledge of facts and skills, conceive value concepts and ethical attitudes, enhance imagination, define clearly life objectives and style.

6.87
168. ATTENBOROUGH, D.: Conservation and communication.

Natural Science in Schools, 17, 1979, No.2, pp. 38-41.
5 figs.

The author deals in his article with wildlife on the Galápagos Islands and its conservation. He mentions in the introduction his opinions concerning the importance of educating in children a positive attitude to nature. He describes first these islands, rich in water, home of some lacertian species, pelicans and tortoises. He deals in detail with giant tortoises. He also mentions another group of islands which are only bare lava rocks without water. Even there, however, life managed to assert itself in the form of cacti and even animals - lizards. Wildlife conservation has become an issue even on the Galápagos Islands, although they are aside from civilization. The eggs of lizards, for example, are endangered by rats that had followed men to the islands. The author further deals with some problems concerning environmental protection in the U.S.A. He mentions the example of bison, discusses conservation of inorganic nature, such as fossils. As regards other most pressing issues of world-wide wildlife conservation, he mentions seal, orang-utan, mountain gorilla and some other animals.

6.87
169. **BARROW, L.H.:** Real problem solving in environmental education.

The American Biology Teacher, 41, 1979, No.9, pp. 560-561.

One form of motivating students is their participation in solving an interesting problem. A set of such "real problems" is offered in materials published for elementary school. A teacher, dealing with environmental education, can make a good use of the teaching unit "Environmental Trips", discussed in detail by the author of this article. This is a field exercise designed for fourth and fifth graders. Pupils visit first a specific region, tell the others what interesting things they have seen there and finally they jointly suggest a route for an environmental trail in this region. The author describes one such trip. The project was subsequently evaluated by the pupils, both orally and in writing. In addition, field exercises contain materials that can be used in elementary school also in teaching some other units, such as Plant Growth, School Zoo, Finding One's Bearings, and others.

6.87
170. **BEBBINGTON, J.:** Towards a better understanding of our environment.

Natural Science in Schools, 18, 1980, No.3, pp. 73-74.

An example how to practically educate children and youth towards a better understanding of environment is the centre founded about 40 km away from London, in 1947. It has all landscape and environmental prerequisites to become attractive for children and young people aged nine to sixteen. In five-day courses, where excursions alternate with lectures, young people are purposefully and on specific examples guided to develop positive attitudes to environmental protection. The courses are combined with entertainment so that a stay in the centre has become a popular part of science teaching.

6.87
171. BOHLEN, J.: Saving wild species through habitat protection.

The Science Teacher, 47, 1980, No.6, pp.20-23.
3 figs.

According to scientific estimate, the world loses one animal species a day, especially for the reason that the habitat of the species is damaged and destroyed. The author deals with this problem and, as a specialist in wild species biology, she expertly discusses forms of saving wild species through habitat protection. She presents specific examples concerning the Chitawan National Park in Nepal, where intensive research has been conducted for six years, with international participation of scholars.

6.87

172. BÖMEKE, R.: Themenkomplex "Müll". /The topic of "Waste"./

Naturwissenschaften im Unterricht, 28, 1980, No.4, pp.104-109.
5 figs.

The ecological problem of waste has become an issue. This is a topic which is a typical example of interdisciplinary problems overreaching the content of biology and involving civics, career education and geography. Man as a consumer considerably contributes to waste. In the German Federal Republic, twenty-seven milion tons of waste are produced yearly. The quantity of waste, however, increases from year to year. A gap widens between economy /efforts to produce more/ and ecology /efforts not to overburden environment by waste/. The above topic is designed to discuss the objectives of responsibility to environment, the knowledge of relationships existing between economy and ecology, comprehension of the consequences of one's activities, comprehension of relationships prevailing in environment and education of pupils to environmental conservation and protection. A teaching model is presented, dealing with the problem of commerce /laws, consumption, growth/, raw materials, origin of waste /quantity/, waste disposal /excursion/, underground water, rivers, lakes and ponds, environmental stress, recycling and other approaches to waste disposal, suitable behaviour aimed at reduction in waste quantity. The author suggests to discuss this topic in seven lessons in biology, in five lessons in geography, in six lessons in career education and in six lessons in civics.

Several teaching subjects are thus involved in dealing with the above topic.

6.87
173. DOYSCHER, R.W.Jr.: The Lesser Antilles: A lesson in conserving natural resources.

The American Biology Teacher, 41, 1979, No.2, pp.86-90.
4 figs., 1 table.

The Lesser Antilles, consisting of a number of islands in the Caribbean, offer a unique opportunity to biologists to observe and investigate the principles of ecology and nature conservation. The article is actually a brief description of the Lesser Antilles and their natural conditions. The author deals with the history of origin of individual islands, beginning first with the physical geography of the archipelago. The section dealing with the origin of living organisms existing on the Antilles is based on three factors: biogenesis documented by paleontological finds, processes of life regeneration on the lava fields after repeated erruptions of the Cracatoa volcano and, finally, on Darwin's evolutionary theories of islands. An interesting section of the article is the reconstruction of natural conditions existing on the islands before the arrival of Europeans and a reflection on the consequences of this colonization in the 17th and 18th centuries. In conclusion, the author discusses some wildlife conservation aspects.

6.87

174. BURTON, J.: *World-wide responsibility.*

Natural Sciences in Schools, 18, 1980, No.1, pp.22-23.

Europeans, Americans, Japanese and other effluent human communities are directly responsible for the disappearance of numerous animal species. For example, a mere few dozen bisons are left from the original sixty million animals. A similar fate awaits fur animals, and also whales, where the figures of their hunting since 1930 are alarming. The article is an interesting contribution to lessons in wildlife conservation.

6.87

175. BUSCHENDORF, J.: *"Rote Listen" der in der DDR gefährdeten Pflanzen - und Tierarten - eine Anregung zur Mitarbeit.* /"Red Lists" of plant and animal species endangered in the German Democratic Republic - an impetus for cooperation./

Biologie in der Schule, 29, 1980, No.11, pp.490-492.

IUCN, founded in the year 1948, began to prepare in 1966 lists of endangered plant and animal species and started publishing an edition called "Red Data Books". The German Democratic Republic joined in these efforts and "Red Lists" have been issued of ferns and Angiosperms concerning both individual regions and the entire country. The publications are conceived along the same methodology. Out of 1.768 species in question, 29 species are declining, 54 species are missing, 103 species are endangered by dying out, 154 species are highly endangered, 251 are little endangered nad 82 are potentially endangered. So far, there have been issued only very few lists dealing with animals. Students interested in this field of work are invited to participate.

6.87
176. BUTLIN, A.: Conservation on games afternoons.

Natural Science in Schools, 18, 1980, No.3, pp.66 and 71.

Eleven- to thirteen-year old boys, who for reasons of health or other reasons do not practise sports on games afternoons, have founded a group devoted to environmental conservation in their town. They meet once a week and clean the small pond located in the nature reserve, look after and make new bird feeding and nesting boxes, tend trees and help to improve the municipal and natural environment. The group is scientifically guided by the Conservation Council.

6.87
177. COLER, R.A. - SWIFT, L.: Demonstrating the limiting nutrient in rural river reaches.

The American Biology Teacher, 42, 1980, No.6, pp. 353-355.
1 fig.

In addition to checking on water purity, authorities investigate the content of nutrients in water streams, especially in rivers into which agricultural soil is washed away. Water samples are subjected to complex laboratory tests to determine the content of nutrients affecting the creation of, for example, algae. The authors of this article, active in the agricultural research station of Massachussets University, have developed a simplified model of the apparatus facilitating to achieve good results in determining the content of nutrients in water; it is especially easy to observe the growth of algae. The biology of water can be demonstrated to students, without their having to work under difficult and time-consuming conditions in the field.

6.87
178. ČEŘOVSKÝ, J.: Ohrožení světového životního prostředí 1979. /Environment endangered on world-wide scale 1979./

Přírodní vědy ve škole, 31, 1979/80, No.8, p.290.

A specialized U.N. agency published a report in 1979 on the four most pressing threats to environment. These are 1. bilharziasis /schistosomiasis/, afflicting acutely 600 million people in 72 countries of the tropical and subtropical regions, 2. environmental pollution by noise. Five hundred occupations are enumerated, involving so much noise as may result in disorders and loss of hearing, 3. tourism damaging the so far intact natural oases, 4. increasing resistance to existing pesticides of pests dangerous both to human health and economy.

6.87

179. ČEŘOVSKÝ, J.: Světová síť chráněných přírodních území I. /World-wide network of protected nature reserves I./

Přírodní vědy ve škole, 31, 1979/80, No.7, pp.242-246.
1 fig.

Special areas in Europe and Asia were carefully guarded from early medieval times to secure the hunting pleasures for feudal lords, such as game enclosures. Thanks to this, many such areas have been preserved in practically unchanged form up to the 20th century. The first national park in the world, teh Yellowstone National Park, was established in the year 1872, the second was established in Australia in 1879 - the Royal National Park, as it is called today. Others followed in Canada, California. As regards Europe, a network of nine national parks of 360.000 ha in area was established in 1909 in Sweden. A number of other protected parks was subsequently established.

In conclusion of his article, the author presents a map summarizing, on world-wide scale, the important existing nature reserves.

6.87

180. ČEŘOVSKÝ, J.: Světová síť chráněných přírodních území II. /World-wide network of protected nature reserves II./

Přírodní vědy ve škole, 31, 1979/80, No.8, pp.282-288.
5 figs.

The article is a continuation of the report published in Přírodní vědy ve škole, 31, 1979/80, No.7 and continues to enumerate and briefly characterizes the protected nature reserves existing today in Africa, North and South America, Australia and Oceania.

6.87
181. EYERS, V.G.: They don't know much, but their hearts are in the right place.

The Australian Science Teachers Journal, 24, 1978, No. 3, pp.73-78.
1 fig., 2 tables.

The author reports in her article on the course and results of a survey she has conducted with Australian third graders. The objective of the research was to investigate the pupils' knowledge and opinions of environment. Each pupil was asked to answer thirty questions from the field of "Knowledge" and ten from the field of "Opinions". The former included, for example, the problems of populations, resources, water pollution, air pollution, nuclear radiation, etc. In the "Opinions" section, the students voiced their opinions concerning the rights of an individual, population control, etc. The results were statistically evaluated by the X^2-text and summarized in tables, distinguishing between school types, states, student sex and knowledge sources. It turned out that most students believed that they had acquired their knowledge mostly from out-of-school sources. The general knowledge of children of the investigated age category was relatively low, while they knew relatively most about the question of populations. They demonstrated an absolute lack of knowledge in the field of exploitation and application of resources and pollution. A significant difference was found between the sexes -

boys were able to give more accurate answers. The author further sums up the six essential consequences stemming, in her opinion, from the survey both with respect to further similar studies and to environmental courses.

6.87
182. FRENSHAM, P.J. - MAY, J.B.: Servant not master - A new role for science in a core of environmental education.

The Australian Science Teachers Journal, 25, 1979, No. 2, pp.15-24.
1 fig.

The authors report on some conclusions reached by the working group of the Conference on integrated science, held in Nijmegen in 1978. The conference delegates discussed various approaches to curriculum, especially the so-called atomistic. This method of curriculum development is typical in that it analyzes individual constituent elements and then synthetizes them. Another curriculum type is the so-called holistic; in this case a general educational objective is conceived as a whole. This group also includes environmental education in Australia, on which the author of this article focused their attention. They discuss the model of environmental education as developed in Nijmegen, from the viewpoints of the relation of the whole to its constituent elements and the relation of the main features to the subject content. In principle, this is an "overlapping" model, where some other subjects are involved, too, in the subject in question /such as mathematics, history, and others/.

6.87

183. GREENALL, A.: Innovations in science education - CDS's environmental education project.

The Australian Science Teachers Journal, 25, 1979, No. 1, pp.41-46.

The author discusses in her article the question of representation of the environmental topic in science education in Australia. This problem is getting increasingly to the foreground on a world-wide scale, however, in Australia in 1974, when Eyers conducted first investigations of the knowledge of tenth graders, it had not spread in schools. The author of this article draws upon the preceding research by evaluating an environmental education project, as developed by the Curriculum Development Centre. The project had been preceded by extensive investigation whose results showed that the environmental problem is represented in each subject of the curriculum. The project was subsequently launched in 1978, it is centrally controlled, while activities in individual states are coordinated by its local representatives. A number of methodological materials have been issued for teachers, acquainting them with the existing state of development of environmental education, organization of teaching, topics for field exercises and with methods of student evaluation.

6.87

184. HART, P. - McCLAREN, M.: Attitudes of high school students toward environmentally oriented issues.

Science Education, 62, 1979, No.4, pp.497-508. 6 tables.

The article discusses a study designed to investigate the attitudes of high school students as potential citizens capable of decision-making on environmentally oriented issues and their possible consequences in the future. The researchers selected 382 students of five high schools for their study. It was conducted by means of written materials consisting of 60 items covering seven factors related to the students' attitudes to the society of the present and of the future. The obtained results were statistically evaluated by using the X^2-test. The authors report in detail on individual investigated factors and some of the correlation coefficients are indicated in summarizing tables.

6.87

185. HINTERMEIER, H.: Vogelschutz - ein aktuelles und vielseitiges Unterrichtsthema. /Bird protection - a topical and diverse teaching topic./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.1, pp.4-14.
11 figs., 2 tables.

The modern concept of bird protection is based on the protection and conservation of environment. Birds are highly sensitive bioindicators of environment that, by an immediate drop or increase in populations, demonstrate the disturbed state or, on the other hand, natural state of the biocenosis - environment. The author therefore voices his surprise over the fact that this problem has so far not been integrated more broadly into the biology curriculum in schools. For that reason, he suggests how to teach the topic concerning the problem of bird protection. He points out to the present state of development of bird populations in Europe, serious problems of bird protection related to their migration flights through Southern Europe, drop in numbers of many species and disappearance of a number of species from Central European regions. He recommends to make use in lessons of the press, notice boards and newspaper and magazine cuttings /it is demonstrated on two model bulletin boards/. Pupils should become acquainted with bird protection laws, they should learn the necessity of limiting poisonous chemicals in plant protection and in fighting pests, they should be guided to active bird protection, to make nesting boxes, feeding boards and boxes. The author also stresses the importance of promoting campaigns concerning the survival and protection of birds.

6.87
186. CHIRAS,D.D.: Models of analyzing environmental issues in the classroom.

The American Biology Teacher, 42, 1980, No.8, pp.471-476, 481.
3 tables.

The harmful products produced by various environments have already been made the subject of discussion in biology education. Since such debates have so far lacked classification, the author of this article has developed three models designed to facilitate students' and teachers' access to this problem. The first is population, sources of harmful products and pollution, the second analysis of causes and effects, the third ethical analysis. Within these models, he deals with the problem of the specific topic of the effects of population on resources, effects of population on pollution, effects of pollution sources, pollution effects on population, pollution effects on resources. In ethical analysis, he deals with the relations of public policy to the effects of harmful products and measures concerning the raising of the quality of environment.

6.87
187. JURČÁK, J.: Některé časně kvetoucí chráněné druhy rostlin. /Some early flowering protected plant species./
Přírodní vědy ve škole, 31, 1979/80, No.6, pp.207-208.
6 photographs.

It is early flowering species of plants whose existence is usually endangered. For that reason, most of them are classified as species protected on the territory of Czechoslovakia. These plants include Pulsatilla slavica, Daphne mezereum, Primula auricula, Soldanella carpatica, Gentiana clusii, Crocus. The above species are characterized by the author and documented by photographs.

6.87
188. JURČÁK, J.:: Některé chráněné druhy rostlin vstavačovitých. /Some protected species of Orchidaceae./
Přírodní vědy ve škole, 31, 1979/80, No.10, pp.367-368.
8 photographs on cover.

The considerable decline in numbers of Orchidaceae observed lately is closely related to the pollution of environment and chemization of agriculture. On the other hand, regular mowing is beneficial for the plants, for it suppresses their competing species. The author points out, however, that it is not enough to protect only specific plant species, rather their whole biotopes. The author further briefly characterizes some protected representatives of this family and documents their beauty by photographs.

6.87
189. KOZAKIEWICZ, A. a M.: *Krajobraz jako jednostka ekologiczna.* /Landscape as an ecological unit./
Biologia w szkole, 33, 1980, No.3, pp.135-141.

A number of subjects deal with the environmental problem in schools today. The conservation and creation of environment are the subject of study in biology, geography, geology, chemistry, hydrology, climatology and ecology - i.e. in different scientific disciplines, therefore in several subjects in schools. The problem also conerns agriculture, industry, tourism and recreation. Landscape constitutes an ecological unit, structurally functional and dynamically larger or smaller section of biosphere, consisting of groups of individual ecosystems, mutually linked through biocenotic and biotopic interrelationships. The author deals with the mutual relationships of the constituent elements of landscape, the paths of substance transfer over the limits of an ecosystem, abiotic and biotic changes taking place in an ecosystem,/exchange of individuals, groups, populations - migration/. He further describes intrapopulation migrations caused by population density, seasonal migrations, forced migrations /fires, floods, human activity, ploughing, forest felling/ and the consequences of migrations both for environment and the migrating animals. The author also discusses the consequences of changes brought about by man /melioration, river regulation/ and problems related to ecosystem stabilization. In conclusion, he pays attention to the ecosystems of Polish nature reserves, national parks, etc.

6.87
190. KOZHIKHAROVA, D.P.: Prirodazashchitna prosveta chrez obucheniyeto po jestestvoznaniye. /Environmental education in science teaching./

Biologiya i khimiya, 23, 1980, No.3, pp.35-37.

The guidelines adopted by the 10th Congress of the Bulgarian Communist Party set the objectives of maintaining the quality of air, water and soil. The same problem was on the agenda of the 11th Congress of the Bulgarian Communist Party.

Teachers, therefore, are faced by the task of fostering in pupils a Leninist attitude to nature, which constitutes a significant component of Communist education.

This objective is being implemented in science classes in topics such as Water, Air, Water Ciruclation, Ores, Soil, Organic Nature, etc.

The author of this article discusses these topics from the viewpoint of environmental education.

6.87

191. KUKAN, Š.: Ochrana prírody a starostlivosť o životné prostredie v učive elementárnej prírodovedy a prírodopisu na základnej škole I. /Nature conservation and care of environment in the subject-matter of elementary science at primary school I./

Přírodní vědy ve škole, 31, 1979/80, No.1, pp.6-8.

Essentials of environmental education are included as early as the first and second classes of primary school, in science lessons. They especially concern the building up of pupils' positive attitudes to wild animals, particularly in winter /feeding of birds and forest animals/. Pupils are also acquainted with the natural sights in their surroundings /regional aspect/.

In civics, taught in the third and fourth classes of primary school, emphasis is laid on relations existing between society and nature. Attention is also focused on conservation of greenery in villages and on maintaining the quality of environment. Pupils are to get acquainted with nature reserves in their surroundings and the reasons of why these places have been chosen and turned into reserves.

Science is also taught in the third and fourth classes of primary school. The objective of this new subject is to lead pupils to an elementary comprehension of the mutual relationship man-environment and education to an active care of environment.

6.87

192. KUKAN, Š.: Ochrana prírody a starostlivosť o životné prostredie v učive elementárnej prírodovedy a prírodopisu na základnej škole II. /Nature conservation and care of environment in the subject-matter of elementary science at primary school II./

Přírodní vědy ve škole, 31, 1979/80, No.2, pp.47-49.

The author analyzes the constituent elements of nature conservation as contained in individual science textbooks designed for primary school. The analysis of the subject-matter content of these textbooks indicates that attention is paid to the above problem, yet the same extent of emphasis is not laid on it in all the textbooks. The author also reminds that the essentials of environmental education are also contained in many other teaching subjects.

The essentials of nature conservation contained in the subject-matter should be educationally utilized and extended by topical problems of today.

6.87

193. LAVENDER, S.: The educational value of a derelict landscape.

Natural Science in Schools, 18, 1980, No.2, pp.34-36. 4 figs.

The copper and zinc mines and the smelting plants of both metals were closed down in Swansea in Great Britain in 1920. The derelict landscape has remained barren for nearly fifty years, when its gradual regeneration was started. The local schools have made use of this opportunity and over five thousand children participated in the process of regeneration by planting trees, bushes and other vegetation. The work was accompanied by an explanation of the causes of this devastation, of soil regeneration, transport problems and planting of vegetation. In 1978, a special book was published for the schools, dealing with the problem of a derelict landscape.

6.87

194. LOKHOVA, I.K.: *Vospitaniye u shkolnikov aktivnoy pozitsii v dele okhrany prirody.* /Educating an active attitude to nature conservation in pupils./

Biologiya v shkole, 54, 1980, No.2, pp.50-54.

It is the main objective of school and extra-curricular facilities to educate in young people correct ecological and conservationist attitudes. Even though children usually get enough information on these topics, they are not able to make use of their knowledge to behave adequately in natural environment. The author uses the example of a dendrological hobby club /for fifth to ninth graders/ to demonstrate some topics designed to develop these constituent elements of pupil personality. The plan of activities of the hobby club is broken down into three-year periods. Pupils get first acquainted with various forest plants and animals, and simultaneously, examples of some people's misbehaviour in the forest are also pointed out to them. Later on, they begin to investigate and document some rare and dying-out plant species. They actively contribute to school and out-of-school meetings concerning nature conservation; the best hobby club members organize, during summer,Young Pioneer camps, conservationist activities, which is the ultimate test of a correct attitude to nature.

6.87

195. MAGYAR, K.: A visegrádi jurta-tábor a természetvédelmi nevelés szolgálatában./A yurt camp in Visegrad serves the objectives of environmental education./

A biológia tanítása, 19, 1980, No.3, pp.67-70.

The author reports on a successful event organized as a contribution to environmental control. The Hungarian Young Pioneer Organization is aware that the fostering of correct opinions of man's attitudes to nature cannot be implemented in the form of a one-time event, rather systematically, by the concerted efforts of school, family and society. The event described here was one of the above mentioned factors. In a yurt camp /after the Mongolian fashion/ children are taught, in the form of play, to develop correct attitudes to nature and its conservation. The organizational arrangements are conceived along the lines of old Mongolian customs and rules of coexistence. Activities are centred around a workbook defining the ranges of topics. The author describes the execution of several such topics: the making and hanging of bird feeding and nesting boxes, a floristic excursion, a drawing competition, etc. In conclusion, the author states that this educational form fosters in pupils correct attitudes to nature.

6.87

196. MATTISKE, J.: Blackburn lake - an urban case study.

The Australian Science Teachers Journal, 24, 1978, No.1, pp.47-52.
5 figs.

Blackburn Lake and the surrounding part are a very popular holiday resort. Very rich vegetation grows in the park, especially trees. A number of interesting animals live on the territory. The teachers of the local primary school make use of the park for excursions. One of the topics, the pupils deal with, is observing the life of herons that fly to the lake every year. Children collect data on the incidence and behaviour of the birds, their food, etc. In addition, they look up interesting data on herons in literature and museum collections. The study of herons suitably motivates presentations about other bird species. The whole region is very interesting from the ecological point of view and offers a number of educational apportunities. A special committee was established at the primary school. Its objective is to save the area of Blackburn Lake from its too intensive use for holiday resort development. The author reports on the campaign and its, so far negative, results.

6.87
197. McDONALD, K.: Case studies in environmental education.
The Australian Science Teachers Journal, 24, 1978,
No.1, pp.5-16.
6 figs.

The author reports on an experiment entitled "Kooragang Island", which can serve as a case study in environmental education. In the introductory section of his article, the author characterizes the investigated area, situated in Newcastle. The basic objective of the study is to determine how man affects the ecosystem of the river estuary. For that reason, the students get first acquainted with the topography of the island, its brief history and the most significant stages of industrial development. This is followed by an excursion to the island itself. The island ecosystem, whose main constituents are mangroove woods, water and moors, can be used to demonstrate food chains, questions of pollution, adaptation, energy binding, questions of population ecology, species diversity and the role of microorganisms. In addition, students investigate the chemism of natural water streams, industrial products and processes, investigate the pollution of water and air. The so-called Hardin-May model was developed to demonstrate the ecological patterns of the Kooragang Island.

6.87
198. NAISMITH, R.W.: Genetic toxicology: An overview.
The American Biology Teacher, 42, 1980, No.8, pp.457-461.

The presence of toxic products in our environment is one of the cruel discoveries of the industrial era. It is necessary to fight them systematically by their identification, to prevent their production. Their harmful effects on gene processes have been reliably confirmed. This has resulted in genetic toxicology; its objective is primarily prevention against the penetration of toxic products into air and food, thus into human organism. The author describes the activities of genetic toxicologists in this new field of science and enumerates substances causing cancer and other diseases that have become the scourge of our era. He reports on the existing state of development of genetic toxicology and calls for a profound learning of the dangerous chemicals.

6.87

199. NIEMIERKO, M.: Realizujemy program Wisla. /Putting into life the Wisla Programme./

Biologia w szkole, 33, 1980, No.3, pp.174-178. 3 figs.

The new curriculum also contains the problem of environmental control. One of the most topical programmes in this respect is the Wisla Programme, focused on controlling the Wisla river and its tributaries. The whole campaign requires adequate publicity in schools, especially grammar schools. The author demonstrates in which section of the curriculum it is possible to make an educational use of this national Polish campaign. In the first stage, this will be the selection of concepts concerning the Wisla Programme. In the first grade of biology-chemistry specialization, the project problems concerning the projects will be dealt with in the topic "Some changes occurring in the surrounding region due to man's activities", in the second grade in the topic 'Efforts to maintain pure water in Poland", in the third grade in the topic "Landscape protection and development with respect to the need of regenerating man's fitness". In the second stage, attention is paid to publicity and information dissemination about the project, School events are organized dealing with the Wisla Project it is submitted for discussion in lessons, papers are presented, notice boards are prepared, displays, seminars are organized. In the third stage, work beneficial to the community is planned to be done in the school surroundings. The author suggests for Warsaw schools a trip to the right embankment of the Wisla river, from Latienkowski Bridge to Gdansk Bridge, where pupils can observe the marked changes that have taken place as a result of man's activities on the Wisla stream. The author presents essential information and didactic instructions for the trip. He also reports on a seminar on the above subject which he organized together with the third and fourth graders of a grammar school for all the students of the school.

6.87

200. OKOŁOW, C.: Białowieski park narodowy jako rezerwat biosfery. /Bialowies national park as a biosphere reserva./
Biologia w szkole, 33, 1980, No.5, pp.259-267.
4 figs.

Bialowies National Park is one of the four Polish and fifty-seven world reserves of biosphere, i.e. it belongs to the cultural and natural heritage of mankind. The first efforts to save it date back to the year 1921; in 1932 it was declared a National Park. It is one of the oldest national parks in Poland. Its area is 5.069 ha, it makes up 4% of the total area of Bialowies Rain Forest and 10% of the Polish section of Bialowies Rain Forest. A large area of the reserve is covered by mud, the rain forest is situated on heavy, inpermeable soils. Out of 22 various plant communities, seventeen types of communities can be found in Bialowies National Park. The author describes them and deals with their composition in greater detail. Coniferous make up 40% of the rain forest growth, deciduous make up 40%. The flora consists of 700 species of higher plants, which constitutes 32% of the total flora in Poland. Two thousand lower plants have been identified on the rain forest area. As for animals, 7.000 animal species can be found in the rain forest, especially invertebrates. There are 56 mammal species, 120 bird species. In the year 1929, they started to regenerate the breeding of European bison, in 1952 it was released to live free on the rain forest area. Today, there are 250 heads of bison living free. Three hundred bisons have been placed in zoological gardens. There exists an extensive literature on Bialowies Rain Forest, it is used to study ecology, plant and animal classification systems, physiology and genetics. It is a source of valuable genetic ecotypes. Today, conservationist work continues in the surroundings of the national park. Tourism has become a problem. Extensive measures have been taken to prevent its harmful effects. The agricultural activities conducted in the immediate vicinity of the park also pose a problem.

6.87
201. PIZZINI, E.L. - GROSS, M.P.: Utilization of advance organizers in environmental education.

Science Education, 62, 1978, No.4, pp.563-569.
2 tables.

The notion of advance organizer is taken over from Ausubel's learning theory, where a certain subsumming concept is meant by the term organizer. The authors characterize first this concept in detail and further report on an experiment designed to analyze the effects of the utilization of advance organizers in environmental education, in connection with a one-day trip. The teaching core chosen for that purpose is called "Forests and I" and it consists of two parts; two auxiliary tests were chosen to evaluate their effectiveness. One tests the knowledge of forest and the other investigates pupil attitudes. The results of the research were statistically processed and summarized in tables. It turned out that the programme containing advance organizers and the one-day trip were demonstrably more effective.

6.87

202. SCHUSTER, M.: Zu neuen Rubrik "Das aktuelle Unterrichtsziel". /On the new column "The topical objective of teaching"./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.1, pp.16-19.
2 figs., 1 transparency.

The author deals with the uses and the consequences of using chemicals in fighting pests. He uses the example of hexachlorcyclohexane application, mentions its composition, properties, uses in agriculture and the ecological consequences. It is produced by photochlorination of benzol. Gamma-HCH has special toxic effects; it is marketed as Lindan. The ecosystem, however, bioaccumulates this substance; it primarily endangers infants as the final link of the food chain.

The author suggests how to conduct the lesson, including a suitable transparency, shows how to meet the teaching objective and mentions suitable teaching media. Hexachlorcyclohexane has been increasingly used since DDT was banned. The lethal effects of HCH can be demonstrated in the classroom on the fruit fly. The lesson will be concluded by pointing out to the food chain: plant-cow-mother-infant. Not a single test of mother milk shows the absence of pesticides. As compared with cow milk, mother milk has a higher concentration of pesticides.

6.87
203. STOKER, B.: Bird table projects.

Natural Science in Schools, 17, 1979, No.2, pp.54-57. 4 figs., 1 table.

The author presents instructions how to make several types of bird tables. He describes how to prevent cats from getting at the table. Among the main types of described bird tables there are, for example, an uncovered board fixed onto the wall, a board protected from the top and from the sides, also fixed onto the wall and a suspended bird table both in board form and specially adapted for titmice. In addition to the design of the bird tables, the author also mentions the choice of suitable food for the most common visitors of the bird tables. A large section of the article is devoted to topics for observation. Children can learn in this way to identify individual species, observe their behaviour patterns, carry out experiments by choosing different food, keep records of arrivals and departures and typical behaviour related to them.

6.87

204. ŠLÉGL, J.: Ekologie edafonu ve školní praxi I.
/Edaphic ecology in schoolroom practice I./
Přírodní vědy ve škole, 31, 1979/80, No.2, pp. 43-46.
2 figs., 4 tables.

Edaphos in the broader sense of the word means all living soil organisms. It also includes plants reaching into the soil with their roots and rhizoids. In the narrower sense it only means soil animals.

Edaphos affects the physical, chemical and biochemical properties of soil, such as structure, porosity, soil reaction, sorption complex, etc. Even several-metre deep high quality black soil had been formed by the activity of soil organisms /one-centimetre layer of soil is formed in the course of 300-500 years/.

The correct functioning of edaphos depends on its standard composition, on such a representation of plant and animal species as may facilitate a dynamic equilibrium. This equilibrium is very vulnerable and easy to be disturbed by human interference, especially by the ungrounded use of various pesticides, but also by excessive fertilization. These facts should be stressed and scientifically explained in biology education.

6.87

205. TARRANT, V.: Conflict in the Kakadu.
The Australian Science Teachers Journal, 24, 1978, No. 1, pp.29-36.
5 figs.

The author of this article deals with a region called the Kakadu, which is going to be declared a nature reserve, yet, simultaneously, plans are prepared to exploit uranium in this area. The author's objective was to describe the character of the area and to explain what were the stands of both the parties involved in its utilization. The Kakadu is situated near the town of Darwin. Its area is over 6.000 km^2. It consists of three main landscape types: lowland with rivers and brooks, very rich in fish and birds, the Arnkemu sloping ridge with many caves which used to be inhabited and are valuable also from the archeological point of view and, finally, there are steppe areas which are often burnt according to the "Programme of Controlled Burning". And this is the area where uranium has been found. The author describes in her article the main stages of the project designed to utilize the entire area.

6.87

206. TREITZ, P.: Beispielhafte Aktion der Arbeitsgruppe Naturschutz Illingen /ANI/: Rettet den Dorfteich !.
/Exemplary event of the working group of conservationists in Illingen /ANI/:Save the village pond!/

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.12, pp.379-380.
1 fig.

The author reports on the exemplary work of the conservationists in Illingen concerned with the saving of ponds and marshes and their maintenance, which will enable to reestablish biological equilibrium in this area. The group plants domestic water plants into the ponds and marshes, producers of green mass serving as the basis for the natural development of further links of pastoral food chains.

6.87

207. TREITZ, P.: Naturschutz im Ostertal. /Nature conservation in Ostertal./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.12, pp.377-378.
3 figs.

The author discusses the problem of nature conservation on the specific example of Ostertal in Saarland, where the Conservation Union is active. The author presents their achievements to demonstrate the possibilities of conservation of species and biotopes today.

6.87

208. TREITZ, P.: Winter als Auslesefaktor - Anmerkungen zur Winterfütterung unsere Vögel. /Winter as selection factor - comments on the winter feeding of our birds./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.1, p.16.

The author points out to the importance of winter as a sector of selection in the Darwinian sense. When analyzing the winter feeding of our birds from this point of view, especially with respect to the present mild winters, we arrive at the correct conclusion that this is man's erroneous interference. Non-migratory birds become threatened only if the winter is really very severe. Feeding results in the survival of weak and diseased individuals, it endangers populations with diseases, etc. In actual fact, man interferes with the factor of selection. On the other hand, however, populations of non-migratory birds grow, they occupy the food niches of migratory birds. The numbers increase of only some species of non-migratory birds, which disturbs the species composition of avifauna.

6.87
209. VIZY, I.: Június 5-e, környezetvédelmi világnap.
/June 5th, the International Nature Conservation Day./

A biológia tanítása, 19, 1980, No.3, pp.65-66.

The author discusses in her article the importance and topicality of nature conservation. June 5th reminds us that "three is only one Earth". Its organic and inorganic nature is endangered, which will require more effective conservation measures than are the existing ones.
The appearance of man and his reproduction gave rise to the concept of nature conservation. Human interference into the biological equilibrium is ever increasing. It has reached catastrophic dimensions in our century. This was an impetus for the U.N. to convene an international conference on this problem in Stockholm on 5th June, 1972.
The solving of the problem does not lie in stopping the development of technology, rather in international cooperation and development of joint projects resulting

in a new form of culture that would not destroy nature. The author points out to the principal importance of environmental education, education through facts, knowledge and evidence resulting in new patterns of behaviour and attitude to nature as required by the present situation, which will also reflect in students' active attitudes.

6.87

210. WADDINGTON, A.: Rearing wildfowl for conservation.
Natural Science in Schools, 17, 1979, No.3, pp.77-80.
2 figs.

The article reports on a project designed to evoke and strengthen children's interest in conservation, in this case by rearing wildfowl. On the school plot, eleven species of duck and pheasant were reared in pairs or in threes; they reproduced regularly. The eggs were incubated either naturally or in a brooder. Children aged nine to eleven took part in the project, working in groups of two, three or four children. They observed the behaviour of the birds long before their reproductory period, during mating call, the laying of eggs and rearing of the young ones. Pupils also tried to supplement their observations by drawings, collages or ather art forms.

6.87

211. WENDEL , W.: Abneigung gegen Spinnen - Unterrichts-versuche zum Abbauen von Antipathien bei Schülern eines 7. Schuljahres. /Dislike of spiders - educational attempts to remove the antipathies of seventh graders./

Der Biologieunterricht, 16, 1980, No.3, pp.4-35. 9 tables.

Anthropomorphism poses a problem for biology education in that it interprets animal behaviour by ascribing to it human qualities. Animals usually respond instinctively to stimulation from outside environment according to a specific pattern. Man, on the other hand, is relatively poor in instinct, but not completely without similar behaviour patterns. The author discusses pupil antipathies toward spiders which often even turn into zoophobia. Repulsion of spiders is inherited, there is an inborn inclination to it or it has been learned. Pupils behave similarly towards snakes, toads and other animals. The author conducted a survey in schools designed to investigate their behaviour towards spiders, he looked for the causes of antipathies and, in an extensive experiment, he attempted, through suitably motivated and conducted biology instruction dealing with the topic of spiders - 6 lessons - to remove the pupils' antipathies of them. The experiment proved that suitably motivated and oriented teaching can to a great extent remove pupil aversion of spiders.

6.87

212. WOODALL, D.G.: Environmental education - The youth conservation corps way.

The American Biology Teacher, 41, 1979, No.6, pp. 341-343.
3 figs.

The author reports in her article on the activities of the youth conservation corps. This is a type of programme included into the environmental education in U.S. high schools. The corps has camps available in all U.S. states, most of them are very well equipped. The corps members are involved mostly in practical work, but also in theoretical instruction focused on the environmental problem. Recreation is also included in the programmes. The teaching methods used by the corps may also be applied on school experimental garden plots. As an example, the author mentions the plan of lectures "Learn Your Surrounding Environment", broken down into individual segmental assignments. In the form of "discovering plays" students get acquainted with questions concerning food chains, energy flow, ecological succession. In addition to field exercises, classroom teaching can be made more lively, too. A very useful aid in this respect is the utilization of simulated situations.

6.87

213. YARROCH, W.: Hazardous waste disposal - a proposal for schools.

The Science Teacher, 47, 1980, No.1, pp.27-28.

The disposal of waste from dangerous chemicals after experimentation in school laboratories and the cleaning of laboratory equipment are a generally recognized problems and numerous science teachers try to cope with them. The author explains who is responsible for waste disposal, describes methods of the most effective waste disposal to prevent the room and air pollution and, in some cases, even to prevent damage to student health.

6.87

214. ZABEL, E. - GEMEINHARDT, M.: Nutzung und Schutz der Umwelt - ein Arbeitsbuch für die AGR "Sozialistische Landskultur". /Utilization and conservation of nature - a workbook for the hobby club "Socialist Landscape Development"./

Biologie in der Schule, 29, 1980, No.5, pp.198-208.
1 fig., 1 table.

Instruction in hobby clubs contributes to personality development and has multiple links to mandatory education. A prerequisite of raising its quality is the preparation of suitable literary aids. The Volk and Wissen publishing house has, therefore, issued two handbooks: Bodenfruchtarbeit and Mikrobiologie. The third is soon to come out - Nutzung und Schutz der Umwelt, designed especially for the hobby club "Socialist Landscape Development". It is based on the objectives set in the programme of the hobby club. The authors of this article explain first the objectives, activities and principles of the methodological guidance of the hobby club, then the specific features in the concept and possible uses of the book containing 208 pages. It consists of seven chapters: Importance of conservation, Realization and planning of conservation in the G.D.R., Clean air, Protection from noise, Rational uses, and conservation of water, Uses and conservation of soil. The authors further present some passages from the book /an experiment -a proof of the effect of SO_2 on plants, from the chapter dealing with water/. They conclude their article be mentioning suitable supplementary literature for teachers.

6.88

215. ALTMANN, A.: Ještě k problému kouření. /Coming back to the problem of smoking./

Přírodní vědy ve škole, 31, 1979/80, No.2, p.53.

Lung cancer is more frequently found in heavy smokers if they live in towns rather than in the country, even though urban smog does not increase the incidence of cancer in non-smokers. A high incidence of lung cancer has also been found in workers inhaling asbestos fibre and in miners working in uranium mines. This increased incidence of the disease applies only to people who are heavy smokers.

6.88

216. BEZARD, W.: Les corps gras: Approche des problémes. /Fats - an approach to the problem./

Biologie-Géologie, 67, 1980, No.1, pp.127-134.

The author deals with fats viewed from the aspect of quantity and quality and their effects on the human organism, as well as the study of their origin and chemical composition. In the following section, the author deals with fatty acids, their origin, including edible oils and ways of using them in food preparation.

6.88

217. BÖHME, O.: Positive Einstellung zum Nichtrauchen entwickeln and festigen. /To develop and reinforce a negative attitude to smoking./

Biologie in der Schule, 29, 1980, No.9, pp.384-386.

The initial smoking of adolescents is influenced by social factors /such as being a gang member, endeavour for conformity/ and psychological features /desire for independence, demonstration of maturity/. These facts may be utilized in education, while it should be borne in mind that even though pupils obtain increasingly more information on the hazards of smoking, the resultant effects are not adequate; especially socially and mentally unstable pupils tend to smoke; prohibition and threats are little effective, education should start before eighth grade. The author further deals with the possible applications of his considerations to various subject-matter topics and to the use of various media /such as notice boards, etc./.

6.88

218. BOZHANOV, A.: Borbata za trezovenost v semeystvoto i obshchestvoto. /Working for abstinence in the family and in the society./

Biologiya i khimiya, 23,1980, No.3, pp.38-40.

The author bases his considerations on the statistical data of foreign and Bulgarian sociologists and stresses the high percentage of smokers and alcohol consumers found in secondary school students. This sociological phenomenon should be fought in the family, society, but primarily at school. Pupils should be acquainted very early with the hazardous consequences of smoking and alcoholism.

As an example, the author includes a table indicating clearly that, among other things, smokers suffer much more frequently from diseases of the upper respiratory tract, insomnia, neuroses, lack of appetite, etc., as compared with non-smokers.

Pupils should be persuaded by specific evidence and instructed on the importance of prevention, i.e. the best way of fighting smoking and alcoholism is to stay away from them.

6.88

219. BUŁHAK-JACHYMCZYK, B.: Biochemiczne podstawy żywienia. /Biochemical foundations of nutrition./

Biologia w szkole, 13, 1980, No.1, pp.14-25.
6 tables.

Nutrition is a physiological process where an exchange takes place between substances, energies and environment. It enables all types of synthetic reactions to be accomplished in the cells of an organism. It also enables the active transportation of substances through cellular membranes, execution of mechanical work, maintenance of body temperature. The regular supply of substances from environment compensates for substances lest and energies spent in biological metabolism, in regeneration of substances making up the cells and tissues themselves, in growth, development and reproduction. Metabolism and exchange of substances concern proteins, nucleic acids, saccharides and lipids. The author analyzes the composition of nutrition of each organism /elements of proteins and various organic and inorganic substances present in living organisms/. Organisms are classified into autotrophic, heterotrophic, chemotrophic, chemolitotrophic, chemoanthrotrophic and phototrophic /photolitotrophic, photoanthrotrophic, photoorganotrophic/. Enzymes play an important role in the transformation of substances and energies. The author discussesthe biochemical foundations of human nutrition based on age, sex, physiological condition, working conditions and accommodation. Substances indespensable for human nutrition are proteins, saccharides, fats, vitamins and minerals. The author deals with the synthesis of high-energy compounds of phosphorus /ATP/, substrate phosphorylation, oxidizing phosphorylation, degradation of amino acids, fatty acids, glycerols and simple saccharides. He compares the content of exogenous amino acids in the proteins of some kinds of nutrition of animal and plant origin. The author further deals with the structure of fatty acids, both saturated and unsaturated, and their proportion and incidence in human nutrition. He also mentions the nomenclature of vitamins and their role. He concludes his article by discussing the adaptation of an organism to changes in nutrition.

6.88

220. CARLIER, H.: Toxicité des matiéres grasses allimentaires. /Toxicity of alimentary fats./

Biologie-Géologie, 67, 1980, No.1, pp.151-155.

The author analyzes - with respect to their possible toxicity - the vegetable oils used in France and also presents the results of experiments carried out on laboratory animals investigating the functioning of their specific organs, weight, temperature and behaviour. In conclusion, she indicates to what an extent it is suitable for people to use vegetable oils.

6.88

221. EISENBLÄTTER, D.: Gesundheitsschäden durch Rauchen. /Health damage caused by smoking./

Biologie in der Schule, 29, 1980, No.6, pp.200-262.

Out of approximately 4.000 chemical compounds formed in a burning cigarette, it is carbon monoxide and nicotine that are considered the most harmful. The mortality rate of smokers is 70% higher than that of non-smokers in cases of lung cancer /90%/, cardiac diseases /25%/ and circulatory system diseases /25%/, bronchitis /75%/. At least one million men and women die due to smoking every year in the world. Smokers smoking over 20 cigarettes daily get myocardial infraction three times more often. According to research in the G.D.R., the smoking of one to five cigarettes a day by men results in the loss of 14% working days and by women, in the loss of 20% working days; the smoking of over five cigarettes a day results in the losses of 20% and 25%, respectively. Non-smokers exposed to smoke suffer from headaches, smarting eyes, sore throat, coughing, respiratory complaints, dizziness, nausea or vomitting. Smoke is an added hazard for allergic and asthmatic persons, naturally also for children /bronchitis, lung pneumonia/. In the G.D.R., 60% men and 25-30% women smoke. Men smoke on the average 17 cigarettes a day, women 10. The consumption of cigarettes per head was 1.683 pieces in the year 1978. According to the survey, 5% thirteen-year olds and 27% fifteen-year olds smoke regularly /1977/.

6.88

222. FROŇKOVÁ, L.: Tématika první pomoci v hodinách přírodopisu. /The topic of first aid in science lessons./

Přírodní vědy ve škole, 31, 1979/80, No.5, pp.163-166.

The author summarizes the most important principles of first aid. It is a suitable aid for teachers and pupils especially of the seventh grade of primary school. She presents brief instructions for handling all consciousness and breathing failures, heavy and medium heavy bleeding and mentions essential anti-shock measures.

6.88

223. GONCHAROVA, G.A.: *Vliyaniye zanyatiy fizkulturoy i sportom na organizm podrostkov.* /The effects of physical education and sports activities on the organism of adolescents./

Biologiya v shkole, 54, 1980, No.3, pp.14-17.

The organism of adolescents sensitively responds to physical stress, to active movement and training. Physical education and sports affect the skeletal and muscular system, respiratory system, the heart and blood circulation and the control system - nervous and humoral. The author also mentions the effects of alcohol and smoking on working capability, reduction in strength, etc. The intake of 80 g alcohol, for, example, worsens the coordination of movements by about 25% /for example, the accuracy of shooting is reduced from 96% to 26%/. One beer /about 20 - 30 g alcohol/ reduces working capability by about 16%. The toxicity of nicotine even in small doses affects adversely the heart, increases the blood pressure, affects breathing, etc.

6.88

224. HEICHEL, G.: *Nikotinmissbrauch durch Schüller und Jugendliche.* /Abuse of nicotine by pupils and adolescents./

Biologie in der Schule, 29, 1980, No.6, pp.263-268.
9 figs., 4 tables.

An anonymous investigation of 1.600 fifth, eigth and ninth graders has confirmed that pupils know the principles of correct diet and that they are aware of the hazards of smoking. The author has investigated separately urban and rural pupils, age of smoking the first cigarette, addiction to cigarettes, places of smoking, number of cigarettes smoked per day. The author summarizes all obtained data in diagrams and tables. Whereas fifth graders smoke because they try to imitate and establish contact in a group, eighth and ninth graders smoke to impress, try to look like adults and they also smoke because of "independence". The author further investigated with whom pupils smoked, where they smoked, whether their parents knew it and from where they got money for cigarettes.

6.88

225. KACKENMEISTER, I.: Zu einer bedeutsamen Erziehungsaufgabe in Biologieunterricht. /Concerning one significant educational objective in biology education./

Biologie in der Schule, 29, 1980, No.11, pp.475-476.

The biology curriculum for the eigth grade requires the application of acquired hygienic knowledge. To meet this objective, it is recommended to make use of topical statistical material, which is documented by the author on the example of teaching the hygiene of the eye and the ear. She makes use of current affairs columns in the Neuen Berliner Illustrierten 5/80 /figures on blind and deaf children/. The lesson is concluded by setting homework with a suitable motivation - what should be done to prevent damage to the organs of hearing.

6.88

226. KULIKOV, A.N.: *Ob antialkoholnoy i antinikotinovoy propagande na urokakh biologii.* /On anti-alcoholic and anti-smoking information in biology education./

Biologiya v shkole, 51, 1980, No.4, pp.41-42.

An analysis of the biology curriculum will confirm that inadequate attention is paid to anti-alcoholic and anti-smoking education; the teacher must choose fitting places to highlight the problem informally. The author of the article suggests how to make use in this respect of the topics discussed in anatomy, physiology and human hygiene in the eighth grade and he also points out to the importance of extracurricular work, such as with popular literature.

6.88

227. KUSAINOVA, S.K.: *Ispolzovaniye sanitarno-prosvetitelnykh listovok v gigienicheskom vospitanii uchashchikhsya.* /Using health-educational leaflets in the hygienic education of pupils./

Biologiya v shköle, 54, 1980, No.3, pp.36-37.

In biology lessons in fifth to seventh grades, as well as in out-of-school activities, emphasis is laid on the pupils' standards of behaviour viewed from the angle of health and hygiene; the author recommends to use for this purpose educational leaflets, issued in several thousand editions by the health education service and the Red Cross. It is possible to make use of the method of pupils' writing short papers dealing with the subjects of individual leaflets.

6.88

228. MAYERHOFEROVÁ, B.: Zdravotná výchova v obsahu vyučovania prírodopisu v 5. a 6. ročníku základnej školy. /Health education in the content of science instruction in the fifth and sixth grades of primary school./

Přírodní vědy ve škole, 31, 1979/80, No.7, pp.252-254.

The author analyzes individual topics taught in science in the fifth and sixth grades from the viewpoint of their effects on man and his environment. In principle, each topic offers and opportunity to talk about health education, both in botany and zoology.

6.88

229. MERRITT, S.V.: Evaluating drugs and food additives for public use: A case studies approach.

The American Biology Teacher, 42, 1980, No.2, pp. 118-119 and 123.

The increasing interest of the public in the safety and non-toxicity of drugs and food additives must, of necessity, find a response also in biology teachers who should, in discussion, inform students about this field of biology. The author of this article has developed a method of study of one drug-thalidomide, added to various medicines, as a marked example of the risks consumers are subjected to, without being aware of the dangerous consequences for their health.

6.88

230. MÖHR, M. - FINKE, A.- SCHONZART, P.: Ernährungsverhelten von Schüllerrinnen und Schülern in Klassen 7 und 8 im Kreis Rudolfstadt. /Nutrition patterns of seventh and eighth graders in Rudolfstadt district./

Biologie in der Schule, 29, 1980, No.4, pp.165-168. 5 tables.

Two grammar school students investigated the nutrition patterns of about 200 seventh and eighth graders by means of a questionnaire consisting of 49 questions. They found that 85% of all children had breakfast at home, 82% took snacks to school, 93% had lunch. Only 33% pupils had regular snacks in the afternoon, 95% had regular dinner. Ninety-five percent pupils considered lunch their main meal. Seventy-one percent children regularly took meals supplied by school. The authors of this article further mention popular and unpopular meals and the effects of the family on nutrition /for example, only 25% parents respected their children's wishes in choosing a meal/.

6.88

231. NELSON, D.: Natural selection, nutrition research and science teaching.

The American Biology Teacher, 42, 1980, No.6, pp. 335-337.

The author, mathematics and zoology professor, discusses questions concerning the relationship between nutrition and natural selection. Nutrition has, for millions of years, been one of the factors resulting in the natural selection of people who have been able to adapt themselves to the existing food conditions. Nutrition is also an important factor affecting the individual changes of human existence, such as ageing, pregnancy, breast-feeding and diseases. A change in existence entails also a change in food types, its dosing in quantity and time. Biology education cannot omit the teaching of this relationship which, so far, has not met with adequate attention in the curriculum.

6.88

232. PARIS, R.: Les graises et leur digestions. /Fats and their digestion./

Biologie-Géologie, 67, 1980, No.1, pp.134-144.
8 figs.

This is an extensive paper dealing with the digestion of fats, including their classification and the digestion of tricarbohydrates. Especially this section deals in detail with the functioning of the human body organs where their cleavage takes place; the author also discusses their positive or negative effects. He also pays attention to their dietary applications.

6.88

233. PEEIL, H.: Wichtiges über das Brot. /The importance of bread./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.10, pp.361-362.
1 table.

The article presents important data on bread,

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its composition, nutrients contained in it, the making of bread, how to keep bread fresh and soft as long as possible. Bread contains vitamins A, B_1, B_2, B_6, D, E, F, K-antianaemic vitamin haemogen and amine of nicotinic acid, p-aminobenzooic acid, pantothenic acid, highly nutritious amino acids, unsaturated fatty acids, various ferments, minerals, trace elements and 2% indigestible cellulose. On the other hand, rye, wholemeal bread and white wheat flour lose up to 84% of its vitamin B_1, 70% of vitamin B_2, 85% of the amides in nicotinic acid, all of vitamin E and 54% of pantothenic acid. The non-dissolvable cellulose in bread has a positive effect on the activity of intestinal flora. Thus bread is a very important food, which contains besides proteins, also fats and sugars, important mineral substances and vitamins which are irreplacable for maintaining human health. Fresh bread can be kept intact by proper packaging, but it should be able to "breathe" and should therefore be kept in a suitable box. Properly baked bread with a crust which has not cracked will keep fresh longer. We can prevent the forming of mildew on bread if the box or vessel in which we keep bread is wiped out once a week with diluted acetic acid. The best storage temperature for bread is 18°C. All types of bread can be frozen and kept for long periods in a deep freeze. For this purpose it is best to wrap the bread in a plastic foil.

6.88
234. PLAT, P.: Alcool, biologie et santé d'enfant.
/Alcohol, biology and the good health of a child./
Biologie-Géologie, 67, 1980, No.3, pp.717-724.

Dr. Plat, the director of a bio-medical research institution, in this paper deals with the problem of alcohol drinking by adolescent youth. He stresses not only the health hazard presented by alcoholic beverages, but also the consequences this has on behaviour, which can easily progress from anti-social behaviour to juvenille delinquency. He deals in detail with various types of alcohol poisoning in children and the effect of alcohol on a young organism. Biological addiction to alcohol is described in a separate section of the article. In conclusion he stresses the need to educate youth so that addiction both to alcohol and tobacco are avoided. Both are very important.

6.88
235. ROCQUELIN, G.: Les lipides dans la ration. /Lipids in daily food intake./
Biologie-Géologie, 67, 1980, No.1, pp.145-150.

The paper deals with the role of food for the human organism, its requirements and the various components of daily needs, their influence on human metabolism and especially the role of lipids, the most important fatty acids and the food sources of fats. The article also includes tables concerning the quantity of fats in vegetable oils.

6.88
236. SEFFRIN, J.J.: Marijuana: assessing the cost,

The Science Teacher, 47, 1980, No.4, pp.29-32.
4 figs.

The author discusses the serious situation which has developed in the use of marijuana and other drugs by young people in the US. The increasing numbers of those who use marijuana, which is called a "youth drug", are analysed in detail in this study. In contrast to other drugs, such as cocain, heroin, opium, nicotine or alcohol, the after-effects of the long-term use of marijuana have not yet been studied, so that teachers do not have the opportunity of giving their students scientific explanations of why the use of the drug is dangerous. Statistics indicate that in 1978, 50% of all college and university students had used marijuana. The author provides specific instructions on how to explain to students the negative impact of drugs and why they should not be used.

6.88
237. SCHWARZ, E.: Verborgene Fetts in unserer Nahrung.
/Hidden fats in our food./

Naturwissenschaften im Unterricht-Biologie, 28,1980,
No.10, pp.351-354. 1 transparanecy.

At present there is a lively discussion among scientists on the problem of correct nutrition. Foods rich in calories and especially in fats, are the cause of various disease or substantially worsen the course on a number of disease. Schools should educate their pupils towards correct nutrition and to explain to them the dangers which follow from incorrect nutrition, as well as the mistakes and errors made in the preparation of food and in eating habits. This should include also an awareness of hidden dangers, for instance when the calory content of a food is increased. The author describes two experiments to demonstrate this: one concerns the quantitative determination of fats in roasted peanuts and the second shows how a fatty film on food makes its digestion slower and more difficult.

6.88

238. STRONCK, D.R.: Blame diet for learning problems.

The American Biology Teacher, **42**, 1980, No.5, pp. 306-307 and 324.

The question of why many pupils do not learn well, or as well as they might, is a problem which is in the center of interest of many teachers. Who is to blame for the fact that many pupils do not study adequately or have not learnt to do so? Are teachers, parents, the curriculum or the mass media to blame or genes? The author stresses correct life styles, which begin already before a child is born. This analysis is based on various statistical data concerning juvenille deliquency and comes to the conclusion that both teachers and those young people who are incapable of concentrating on study should devote more attention to the problem of a correct life styles, including nutritional aspects.

6.88

239. YAGER, R.E.: Nutrition and new goals for biological education.

The American Biology Teacher, 42, 1980, No.6, pp. 361-362.

The tasks of professional education have been gradually changing. In contrast to physics, where there are unchanging axioms, the tasks of biology determined in earlier times now seem obsolete and no longer adequate to the needs of the present. One of these tasks is to learn about nutrition in the biology course. The influence of correct or incorrect nutrition on the whole human organism, including the mental state of a person, is at present sufficiently well known to become a permanent part of the biology syllabus. Biology teachers should provide pupils will basic knowledge concerning nutrition, which they will need both in their own lives and for the purpose of further study.

6.88

240. YAGER, R.E.: Nutrition: A science for our time.

The Science Teacher, 47, 1980, No.6, pp.38-39.

The success of Soviet science in the field of astronautics during the fifties and sixties has inspired the authors of American textbooks to include problems of space exploration into textbooks. Also for the eighties, according to the law, teaching on nutrition problems is mandatory in secondary schools, where children and youth should learn about correct nutrition, about the need to economize on food and last but not least about how to prevent disease, especially cancer. The author provides various comments on this law and recommends considering the teaching of nutritional problems as one of the most important in school.

6.29

241. ALBRECHT, G.: Sexualerziehung in der Sekundarstufe I. Ein Vergleich der Sachstrukturen "Sexualität" für die klasse 5 und 9/10. /Sexual education in the upper classes of elementary school. A comparison of the factual structure of the topic "sexuality" in the 5th and in the 9th-10th classes./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.5, pp.138-142. 2 tabs.

Sexual education within school teaching is considered to be a form of providing pupils with practical knowledge needed in their own lives. But sexual education brings with it a number of problems, which require clarification and whose solution can contribute to achiving more extensive biological knowledge. Such problems depend on the age of the pupils and the degree of their sexual maturity. By comparing the factual structures of the syllabus in the 5th and in the 9th and 10th classes the author is able to provide a complex approach to the content of sexual education, which will be adequate to the age of the pupils in the mentioned classes.

6.89

242. LEWIN, D.H.: How sex survived a seven-year struggle - starting a sex education program.

The American Biology Teacher, 41, 1979, No.5, pp. 295-297.

Human sexuality is today one of the most often discussed problems which form a part of the secondary school curriculum. The author describes the preparation, development and experimental teaching of a sexual education course at a high school in Chelmsford, Massachusetts. Seven years ago a committee for health education had been set up and thanks to its activities, sex education became part of the curriculum. During the first stage of the project those who taught the subject participated in various courses to prepare them for their tasks. The aim of the second stage of the program was to draw up a new syllabus and to educate the public with the help of public information media. The course took 3 weeks and countained 4 topics - veneral disease; pregnancy; contraception and abortion; anatomy, physiology and emotional and value aspects. The effectiveness of the course was tested before and after it was taken.

6.89

243. PILARSKI, W. - STEPCZAK, K.: Zagadnenia wychowania seksualnego młodzieży. /Problems concerning the sexual education of youth./

Biologia w szkole, 33, 1980, No.1, pp.51-53.

Sexual education is a subject of constant discussion both at school and in the family. The family stresses the aspect of motivation and the methods and ways in which those concerned act, while in school a general program of sexual education is implemented. Sexual education is one of the main tasks of biology teaching, but it is not limited only to biology. The article provides information on the course of a two-year research project based on questionnairs administered to school pupils and their parents in various urban, as well as rural schools in the Gorzowski and Zelenogorski regions. The questionnairs were administered to pupils in the 7th and 8th grades of primary school and to the pupils of the 1st and 4th classes of general education secondary schools. They were filled in during biology lessons. Also the parents of these pupils were given questionnairs. The article brings findings concerning the responses of 261 pupils /158 girls and 103 boys/ and 152 parents /95 mothers and 57 fathers/. The project dealt with such problems as when to begin providing children with information on sexual problems: 8.5% of parents consider 12 years as the time to begin, 70% between 12 and 16 years, 16% individually, according to the degree of maturity of the child. 64% of the pupils asked for sexual education before the completion of the 12th year. 25% of parents expressed the opinion that they have told their children everything about sexual problems, but pupils cited entirely different opinions. Only 6.3% of the girls and 1.9% of the boys said they were satisfied with the information provided by their parents concerning sexual problems; 43% said they thought parents should provide this information, 23% cited teachers and 24% a physician. Among the pupils, only 3% said this information in fact came from a physician, 10% cited teachers and 60% said they gained their first information on sexual problems from their classmates, which is considered to be negative. Schools can only stress the varied and complex nature of family life, which usually also provides the prerequisites for the proper sexual education of children.

6.89

244. ULYSSE, J.: Information et education biologiques. Information et education sexuelles dans l'enseignement du second degré. /Information and biological education. Information and sexual education in secondary school teaching./

Biologie-Géologie, 67, 1980, No.3, pp.643-646.

A paper presented by the author at the 6th symposium on sexual education, where he sums up his own experiences and observations. He expresses the opinion that sexual education is highly necessary in schools, in order to prepare pupils for life, marriage and planned parenthood. This is also the reason why biology professors demand an increase in the number of teaching hours devoted to this topic in the higher classes of basic school.

6.90

245. BELKINA, G.A.: Proforientatsionnaya rabota v processe obucheniya biologii. /Vocational guidance in the course of biology teaching./

In the course of teaching various topics within the biology syllabus the teacher has the opportunity to influence pupils, as far as their vocational choices are concerned, into those jobs which from the point of view of the national economy are most needed. On the basis of the specific example of the Krasnodarsk region, the author describes her own experiences with teaching those topics which are best suited for stressing the importance of specific jobs and the future of specific professions, especially those which are connected with agriculture, forestry and with health care.

6.90

246. MARKS, J.H.: A new career option for biology students. The American Biology Teacher, 42, 1980, No.8, pp.468-470.

By breaking the genetic code /Watson and Crick/ in 1953 a revolutionary change has taken place in molecular genetics. Today we know that almost 3000 diseases are of genetic origin and that these diseases are the cause of the death of some 50 million Americans every years. Genetic engineering is a new profession, which now employs the graduates of medical schools. In the future it will, however, be the subject of new curriculums, which the author discusses and describes in some detail. The author herself is director of genetic engineering studies at a university. Graduates in this specialization have very promising outlooks - in consultancy careers or in research.

6.93
247. Biologieunterricht und Zivilverteidigung. /Biology teaching and civilian defence./
Biologie in der Schule, 29, 1980, No.5, pp.177-187.
1 fig.

The article contains recommendations of the Ministry of Education concerning the use of new biological knowledge in the teaching of civilian defence which aims above all at stimulating the iniciative of pupils. The biology syllabus for the 7th class is related to civilian defence/in the topics on bacteria/, as well as the 8th class syllabus /the topic human biology/, the 9th class syllabus /the topic on communities of organisms/, as well as the loth class syllabus /the topic mutations and modifications/. Various aspects of civilian defence education are developed in detail in the context of the biology syllabus, together with specific examples and the methodology of their presentation to pupils. In conclusion, the author cites suitable teaching aids for these purposes and a bibliography on the subject.

7.9
248. BERKA, C.: Postep pedagogiczny w nowym systemie oświaty. /Pedagogical procedures in the new educational system./
Biologia w szkole, 13, 1980, No.5, pp.270-274.

The main task in the modernization of the teaching and educational system is the activation of teachers in developing pedagogical approaches in all types of schools and in all educational institutions. The author discusses the modernization of the education and teaching process and the various work done by teachers and scholars in this field. He especially stresses the most essential aspects of modernization.

7.13
249. CIEMOCHOWSKA, J.: *Metoda problemova na lekcjach biologii.* /The problem method in biology lessons./ Biologia w szkole, 33, 1980, No.2, pp.95-98.

The problem method in teaching has a positive impact upon the teaching and educational process in all subjects, including biology. The essence of problem teaching is discussed. Not every assignment given to pupils is a real problem and thus does not form the point of departure for problem teaching. The teacher should be aware of the fact that there are so-called closed assignments, where the answer is already provided in the formulation of the task or is clear from what is already known about the topic. A true problem assignment contains a problem whose solution is not clear from what the pupils have already learnt. In other words a problem arises when pupils have incomplete knowledge of a topic, when they have insufficient information or theoretical knowledge. It is important to form a problem situation during which the problem is formulated; then its solution is planned, a hypothesis formulated for verification, etc. The author demonstrates the use of the problem method in the 5th class when the topic of fruits and seeds, their importance for a plant and their economic importance for man are taught. The author here formulates educational and teaching goals, teaching media and methods, the teaching forms used and the use of problem teaching in this topic.

7.13

250. DYLLA, K.: Ansätze zu einem problemorientierten Biologieunterricht auf der gymnasium Oberstufe der Sekundarstufe II. /Incentives for problem orientated teaching in the upper classes of general education secondary schools./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 2, pp.42-57. 4 tabs.

The author deals with various aspects of problem teaching in the upper classes of general education secondary school. At present there are many discussions on problem teaching; some educators have criticised its use in some subjects, such as biology. The author first attempts to define problem teaching and a problem situation, and stresses the importance of problem teaching for a biological education; he distinguishes analytical, synthetic and dialectical problems in teaching. He also discussed the problem of so-called empty places, which cannot be filled in on the basis of what pupils have already learnt. A problem in a biology course must not necessarily represent a problem only for the pupil, but also for the teacher /how this should be presented to the pupils is described/. A problem always represents a conflict situation. The author concludes that in a sense, the whole biology course should have the form of problem solving. The majority of the problems dealt with in the biology syllabus present actually fictional problems, whereas real problems encountered by the pupils in their lives should be dealt with.

The author in this context distinguishes an actual situation, a typical situation from life, a historical situation and a typical human situation, all concerning a given problem. All life situations are real situations, which the pupil can experience as an individual; a human life is in itself an endless series of real situations. The author also discusses biology teaching in secondary schools and institutions of higher learning, where as a consequence of the fragmentation of basic biological disciplines, teaching is often devoid of problems, while in secondary schools as a consequence of maintaining a division into basic biological disciplines, problems must arise. From a didactical point of view there are also many problems to solve.

7.13
251. IWON, W.: Problemstellungen im Biologieunterricht der Sekundarstufe I. Der aufrechte Gang des Menschen. /The forming of problems in biology teaching in secondary schools I. The upright walking of man./ Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.1, pp.2-3. 4 figs.

One of the important means of modernizing biology teaching is the use of problem teaching and the forming of problem situations. The article demonstrates the possibilities of using problem situations and problem teaching when explaining the upright walking of man. The teacher should use transparencies, which he can make himself on the basis of the pictures attached to the article. The described method of teaching this topic requires extensive activity on the part of the pupils in the course of the lesson, increases the pupils' motivation, provides excercises in logical thinking in the course of solving problems. Among the problems which are suitable for solving in the course of a lesson are the structure of the human body /especially the skeleton/ for upright walking. During the solving of this problem the teacher can show the skeleton of a human and a dog; the pupils are asked to make comparisons and to describe both. Next, the teacher demonstrates a model of a spinal column of man and some animal; the double s shape of the human spinal column under loading is explained. Also on the basis of a transparency pupils can compare the structure of legs of a human and a primate. The structure of the human foot can be compared to the structure of a bridge and pupils on the basis of their knowledge in physics can describe the distribution of the weight of the body on the foot of a human and a primate.

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7.13
252. PFANNSTEINEL, G.: Warum können Schlange grosse Beutetiere verschligen. /Why are snakes capable of swallowing large prey ?/

Naturwissenschaften im Unterricht, 28, 1980, No.7, pp.203-206. 2 figs.

The author describes how, when teaching the topic reptiles, it is possible to deal with the problem of how it is possible for snakes to swallow large prey. During a factual analysis of the adaptation of snakes for the swallowing of large prey this problem can be solved. Snakes swallow their prey head first , in the direction of the feathers of hunted birds or the direction of the fur of hunted mammals. Swallowing is made possible by fact that the jaws of a snake can be streched due to the special structure of the skull, which on the other hand causes snakes to be deaf. Also the structure of the lungs is adapted to swallowing large objects /in the majority of snakes the left lung is involuted/, the trachea has special characteristics /it is flexible and during swallowing serves as a respiratory organ/ and also other body organs in a snake have a special structure. Also the movement of the muscles and ribs during swallowing are described. The topic is a suitable example of how to explain the mutual relationships which exist among biological phenomena and their complexity.

7.13
253.WERNER, D.: Research on Topics with Unknown Answers.
The American Biology Teacher, 41, 1979, No.1, pp.48-49.

The article deals with a research project which was carried out at a high school in Rutherford. Students had the opportunity of chosing a problem to which they did not know the answer. They attempted to find answers just as scientists seek answers to problems. The radio, TV, the press and periodicals found in the school library etc. served as sources of information. Examples of possible problems are cited, such as whether people can effectively utilize "marine agriculture", what is the price of mega-vitamin cures, whether people can survive independently under water in the sea, etc. The student deals with the selected problem in an essay under the supervision of the biology teacher. In a survey the author cites the advantages which this type of teaching has /an interdisciplinary approach, learning basic scientific approaches, becoming acquainted with the sources and processing of information, etc./.

7.6

254. BREWER, W.B.: School based curriculum development-myth and reality.
The Australian Science Teachers Journal, 24, 1978, No.2, pp.51-54.

The article deals with the development of curricula which have been designed by schools themselves. This represents a new trend in education and teaching both in the USA and in Australia. It is based on the opinion that schools are independent units of the whole school system and as such they should be able to design their own versions of their curriculum. The question, however, arises, whether all schools are capable of actually doing so. A danger posed by such procedures is that attempts will be made to include only fashionable subjects or to introduce innovations for incorrect reasons. The development of school based curricula is not always the same, but nevertheless certain steps seem to exist in common. Usually the process begins with a detailed description of existing curricula, accompanied by some method of analysis and the internal descision on how to procede further. Then it is necessary to determine the direction and purpose of this development. Finally the author comes to the conclusion that the development of curricula based in schools is a slow process, which of necessity is accompanied by errors, because it represents a change in the method of education.

7.6

255. COUGH, N.P.: *The New Practicability of Curriculum Theory.*

The Australian Science Teachers Journal, 24, 1978, No.2, pp.31-40.

The author attempts to show that the use of the new curriculum theory, as developed by Schwab and other authors, is the same as the trend for curriculum design by schools themselves, which is typical for Australia. He discusses the work done by Schwab and Stenhouse, because their approach to the problem is similar in a number of aspects. The author then goes on to discuss some practical limitations of the theory of education and teaching, and the forming of curriculums as their practical aspect. In the opinion of the above cited authors, curriculum theory in fact concentrates on a study of a class and the work of a teacher in class. The role of the teacher as the practical user of a curriculum is discussed. A high quality curriculum can only be formed on the basis of discussions, with all of those who are concerned with the problem. The author describes some of the characteristics of these groups and defines discussions in these groups as the basic methodology of curriculum design.

7.6

256. KLINGHAMMER, E.: Ethology in High School.

The American Biology Teacher, 41, 1979, No.7, pp. 416-419. 2 figs.

Ethology /the science of animal behaviour/ has recently to an increasing extent been included into the syllabi of basic schools. The article describes the basic methodology of teaching ethology, which for the purpose of basic school should not be too time-consuming or difficult. The foundation of any ethological studies must be repreated observations, which are recorded and eventually statistically assessed. The pupils can work in groups to save the time needed for obtaining a sufficient amount of data. An important part of excercises in ethology is the training of correct interpretations of what has been observed. Either an oral form can be chosen, for instance student "miniconferences" or the form of a written essay, which is more demanding because it requires precise and comprehensive formulations. Both methods should be accompanied with illustrations /photographs, drawings, graphs, etc./.

7.6

257. LUCAS, K.B.: A different type of science curriculum.

The Australian Science Teachers Journal, 25, 1979, No.1, pp.47-53.

The article acquaints the reader with the main principles and opinions concerning psychology, held by prof. Novak of Cornell University. Among his most recent publications is The Theory of Education /1977/ and The Psychology of Education /1978/. At the beginning of his career, Novak was interested in cybernetic models of education, above all in relation to the solution of problems. Later he concentrated more on the formulation of notions. Ausubel's theory of education had a strong influence upon this work. His most recent work is concerned with the development and forming of a curriculum. Novak's nature science courses are based on several principles: the development of basic notions, positive affective attitudes of students, their ability to use the knowledge they have gained for the solution of complex problems, achieving an understanding of values and an understanding of social consequences. Novak considers the most suitable structural organization of a curriculum to be extensive outlines of notions. A curriculum should be based on sequences. The article sums up Novak's opinions concerning the foundation for the application of a curriculum and methods of solving problems in the course of teaching.

7.6
258. THOMAS, I.D.: A decision framework for school-based decision-making.

The Australian Science Teachers Journal, 24, 1978, No.2, pp.63-68. 5 figs.

The article describes the structural stratification of decision-making at various levels which is connected with a school-based curriculum. Such decision-making structures are described for agricultural schools, but they can be applied also in different applications. The purpose of forming such structural outlines is above all to help in determining priorities and providing a rational foundation for decision-making, beginning with the level of the individual teacher. Such an outline is not intended as as instruction, but rather as a key to the decision-making role. Besides this basic outline, the author also analyses derived types which express relations in initial decision-making when designing methodological handbooks or manuals and the general framework for curricula and syllabi for individual teaching subject.

7.9

259. IVANOV, Y.Y.: K novim uspekham. /Towards new successes./ Biologiya v shkole, 54, 1980, No.3, pp.3-6.

An introductory article which stresses the most important factors which influence increasing the effectiveness of biology teaching: the basic task at present is to improve the quality of the teaching lesson which requires thorough preparation, an emotional approach on the part of the teacher and the creative utilization of various methods of teaching, so that among others, pupils also learn to gain knowledge in an independent manner. The organisation of the pupils homework deserves special attention; the main purpose of homework is the strengthening and extension of pupils' knowledge, skills and habits gained in the course of a teaching lesson. A biology teacher should devote increased attention to improving the methodology of his own work - beginning with the selection of a topic to be taught, its didactical preparation and the optimum utilization of ostensive teaching aids. An important aspect of biology teaching is work education, education towards atheism, the development of various leisuretime activities and hobby clubs, as well as elective courses and properly furnishing biology classrooms with various aids, instruments and other furnishings.

7.9

260. NOVAK, J.D.: Applying psychology and philosophy to the improvement of laboratory teaching.

The American Biology Teacher, 41, 1979, No.8, pp. 466-474. 4 figs.

The author in this article discusses the role of education theory for biology teaching, especially during laboratory work. In the introduction he sums up the basic ideas of some theories, among them Ausubel's assimilation theory. He describes the development of thought and cognition in the course of ontogenesis and briefly describes Herrigel's, Toulmin's and Kuhn's theories. The author deals in greater detail with opportunities for applying philosophy in laboratory teaching. He explains how to suitably express key ideas concerning the nature of cognition and the process of forming new conclusions - for this purpose an outline called Gowin's epistemiological "V" is described. Its foundation is formed by objects found in the natural world. The left tip represents methodological elements in the creation of new knowledge. The author describes in detail methods of work with this basic model and its possible applications.

7.9

261. RAUSCH, K.A.: Erfahrungen mit dem Problem der Wissenschaftsorientierung im Sachunterricht der Primarstufe. /Experiences with the problem of scientific orientation in factual teaching at the elementary level./

Der Biologieunterricht, 16, 1980, No.2, pp.5-15.

A number of problems are connected with the modernization of the teaching subject factual learning at the elementary level of basic school. The author here comments on the forming of a suitable foundation for specialized teaching in natural science subjects in the upper classes of basic school, how to motivate pupils in elementary classes towards learning in upper classes and how to assure that pupils at the elementary level learn such scientific knowledge which would be in accord with the present state of the natural sciences. The author deals with these problems on the basis of his own observations and experiences with teaching factual learning where he has worked as a school supervisior for this subject. He has also conducted methodological seminars for teachers on this teaching subject. He discusses basic problems, the existing instructions concerning this subject in various regions of the Federal Republic and the role of the form teacher, as well as problems of co- education, the individualization of teaching, the direction in which the skills of pupils should be orientated, the links between school and everyday life, and the adequacy of what the pupils learn from the point of view of their age. The article also deals with the problem of developing intellingence and logical thinking. The problem of orientating the subject-matter taught at the elementary level of basic school towards more scientific concepts can be dealt with successfully.

7.9
262. SÍBRT, F.: K realizaci nového pojetí přírodopisu. /Towards the implementation of the new concept in nature studies./

Přírodní vědy ve škole, 31, 1979/80, No.8, pp.288-289.

One of the main tasks and aims of the new concept of the teaching subject nature studies is the implementation of the requirement that pupils learn an integrated system of basic knowledge concerning living and non-living nature, the laws of its development and the material essence of natural processes. In connection with modern trends in the natural sciences, the syllabus contains basic new material from various disciplines. The syllabus is conceived on the basis of a general biology approach and the division of the syllabus into various topics is subjected to this principle.

7.9
263. SPÖRLE, E.: Gedanken zur gegenwärtigen Situation der Schulbiologie. /Some considerations on the present state of school biology./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.8, pp.494-500.

The author cites his experiences gained in school teaching, in teaching a seminar and in carrying out visits to classrooms as a supervisor, as well as in conversations with many teachers and with biology students, with school leaving examinations in biology and the present state of school biology.He poses the question of whether contemporary modernized biology teaching actually fulfils all the tasks and aims which it has set for itself. Conclusions are arrived at in view of the future. The modernization of biology teaching has been taking place for several years: during its first stage stress was placed on "the courage of acknowledging gaps"; later model teaching attempted to solve the problem of the knowledge explosion in the biological sciences. It has been found that the concept of model teaching has been successful in dealing with the problem of the explosion of knowledge in the biological sciences which we are now experiencing. The author also assesses teaching methods in this context. An original natural object is considered to be the most valuable teaching aid, as well as those teaching aids which allow an active approach to learning and the existence of immediate contacts between pupils and living nature, as well as observations in nature and experiments. Among those aids which serve as substitutes for natural objects, the author critically assesses for instance transparent foils, worksheets, the projection of microscopical objects, etc. He points to their advantages /savings of time, observation by large groups of pupils/, but also stresses their passive transmission of information and indicates when such aids should be used and when not. He stresses the importance of drawings by the teacher on the blackboard and considers the advantages of such drawings in comparison to the use of transparencies. He also critically assesses the projection of various tables, graphs and diagrams and stresses that it is much better to have the pupil participate in drawing up such tables on the blackboard. In conclusion, the work on a new biology syllabus for schools in the Federal Republic is described and the number of teaching hours spent on each topic is indicated. With the exception of the upper classes of general education secondary schools, the number of teaching lessons devoted to biology remains unchanged, while the content of teaching has increased; thus also the pressures exerted upon the teacher are increasing.

8.1
264. BARRASS, R.: Vocabulary for introductory courses in biology: necessary, unnecessary and misleading terms.

Journal of Biological Education, 13, 1979, No.3, pp. 179-191. 1 tab.

Specialized terms play an important role in the language used by the natural sciences. In a single textbook a total of more than 1500 such terms can be found and its authors must decide which are really necessary. Especially for beginners a number of these terms are either unnecessary or misleading, if they have become obsolete and lead to errors. The author of the article cites a number of examples which are summed up in a table. For gathering these examples the author went through 6 various teaching syllabi and several textbooks used in England, Wales, Scotland and Northern Ireland. The terms are grouped into three sections - on biology, chemistry and physics plus mathematics.

8.7

265. CLEGG, A.S. - MORLEY, M.: Applied science - a course for pupils of low educational achievement.

The School Science Review, 61, 1980, No.216, pp.454-463.

The authors, who are teachers in special schools, describe their experiences with teaching the natural sciences to pupils who are not entirely mentally normal. They stress the aspect of creative work where the final product is a concrete object. In the structure of their course they have included astronomy, corrosion, nutrition, genetics, light and even such topics as electronics and others, including photography and meteorology. Their methods are applicable to 14-16 year - olds.

8.7

266. SLAVIN, L.E.: A viable approach for LD/EH students in a biology course.

The American Biology Teacher, 41, 1979, No.3, pp.164-170, 189. 4 tabs.

Recently in a number of states in the US, teaching programs for low achievement students have been formed. The author here discusses biology teaching for learning disabled /LD/ and emotionally handicapped /EH/ students. He provides a brief survey of both types of programs and how one of them was implemented in a school in Alabama. Specific behaviour reactions among students are described and the role of the teacher in various subjects, as well as his special qualification for teaching this type of student. The article also discusses various teaching methods, such as discussions, laboratory work, games, outdoor excursions and the use of films. The article also includes a detailed description on how to teach specific topics, such as microbiology, etc.

8.7
267. STRONCK, D.R.: The Educational Implications of Human Individuality.

The American Biology Teacher, 42, 1980, No.3, pp.146-151.

In the sixth class a number of different individualities can be found. Out of a group of 40 students, 2 girls were found to be fully mature, 8 were child-like and 10 pre-adolescent, 16 boys were child-like and 4 were pre-adolescent. The average weight of the students was in the vicinity of 50 kg, their height 160-172 cm. Also intelligence, talent, diligence, perseverance, physical abilities and character traits were found to have individual aspects. On the basis of this data the author discusses the educational implications of these differences, on the basis of practical findings of educational science and psychology; he comes to the conclusion that the essence of a teacher's problem is to distinguish the individuality of a student, based on a thorough study of his or her psychological and physiological characteristics.

8.7

268. THEOBALD, J.H.: Individualization - a complex problem often oversimplified.

The Australian Science Teachers Journal, 24, 1978, No.3, pp.55-60. 3 figs., 1 tab.

When adjusting teaching methods to individual differences among students there is often a tendency to consider these differences in terms of general abilities. The aim of the author in this article is to attempt to point out other characteristics of students, such as personality and cognitive preferences, which also interact with teaching styles. The author compares the findings and opinions of various authors /Craudall, Cronbach, Walters, Siebens and others/. On the basis of various studies, 4 personality factors in students are defined: impulsiveness, neuroticism, dogmatism and "non-intellect". The author describes in detail a research project which deals with the relation between the attitudes of students and aspects of teaching, from the point of view of cognition. Diagnostic and attitude tests from the Australian Center for Educational Research were used in the project.

Regression methods were used for an analysis of the data obtained.

8.8

269. ALTMANN, A.: Baktérie a matematika. /Bacteria and mathematics./

Přírodní vědy ve škole, 31, 1979/80, No.10, p.372.

The length of a bacterial cell is between 1 and 5 μm /1 μm = 0,001 mm/, their width is from 0.2 μm to 1 μ m. Under conditions existing in the majority of schools it is thus best to observe colonies of bacteria in agar plates which have a semicircular shape and are sized approximately 2 mm in diameter. The author provides instructions for the calculation of the volume of a cylinder shaped bacterial cell. The volume of a colony, designated as V_2, with a diameter of $r_2 = 1{,}0$ mm can be calculated on the basis of the following equation

$$V_2 = \frac{4/3\,\pi r_2^3}{2}$$

By dividing the volume of the whole colony by the volume of 1 cylindrical bacteria we obtain the number of bacteria forming the colony.

8.8

270. ARRIGONI, M. - STEINER, A.: Manfred Eigens Evolutionstheorie Darwinischer Systeme. /Manfred Eigen's evolution theory of the Darwinian system./
Der mathematische und naturwissenschaftliche Unterricht
33, 1980, No.7, pp.385-389.
4 figs.

The article describes the use of mathematical methods used in biological studies and in solving practical problems concerning the Darwinian system. The authors provide mathematical calculations for how many fishes are available for fishing in the sea without damaging the population of individual species, the incidence of mutations in a population /which depends on the nucleic acid found in the population/ and how to determine the degree of mutation. Also the competition between a wild type of phage and a mutant can be expressed mathematically.

8.8
271. BAUER, H.: Zur fachübergreifenden Beziehung von Chemieunterricht zum Biologieunterricht in Klasse 8. /Concerning interdisciplinary relations in chemistry and biology in the 8th class./

Biologie in der Schule, 29, 1980, No.9, pp.370-371.

On the basis of the author's own experience he comes to the conclusion that the links which exist between biology and chemistry represent a necessary prerequisite for understanding the syllabus, especially in those sections which concern the essence of living processes. For biology teaching in the 8th class, knowledge gained in the teaching of physics and chemistry are very important. Especially the chemistry syllabus for the 7th and 8th classes is important for biology teaching. The author documents this on the basis of the problem of oxydation and metabolism and topics concerning movement and the use of muscles.

8.8
272. BIGGINS, D.R.+ HENDERSON, I.: On the role of social studies of science teaching.

The Australian Science Teachers Journal, 24, 1978, No.1 pp.53-64.

Some aspects of social studies, such as history or philosophy, are to a growing extent at present becoming a part of natural science teaching. The authors are interested particularly in these aspects of teaching. They first discuss the contribution which a study of the social sciences can make to the study of natural science studies; this includes an analysis of society, as well as the role of natural sciences in society. The social factors which determine the direction of natural science studies should be identified and described. Another aspect is an analysis of those elements in the natural sciences, which have a bearing on the relation between the natural sciences and technology, the overcoming of social superstitions related to the natural sciences, the social determination of basic scientific research and the social content of knowledge in the natural sciences. The authors discuss in detail all these aspects and cite the opinions of different authors, who have been concerned with these problems.

8.8.

273. BOYADZHIYEVA, A.: Geografski znaniya v obuchenieto po biologiya. /Geographical knowledge in biology teaching./ Biologiya i khimiya, 23, 1980, No.5, pp.33-39.

The most important relation between biology and geography can be found in that part of the syllabus which deals with nature conservation and environmental control and which represents one of the most important aspects of polytechnical education.

In this sense, this common task of both teaching subjects can be divided into the following 3 stages, on the basis of the age of the pupils being taught:

1st stage - specification of topics for pupils in the 1st to 4th classes;
2nd stage - specification of topics for pupils in the 5th to 7th classes;
3rd stage - specification of topics for pupils in the 8th to 10th classes.

8.8
274. CAWTHRON, E.R. - ROWELLA, J.A.: What is Science ? Attitudes Towards Science Held by Tertiary Students and Staff; Is There an Arts Science Difference ?

The Australian Science Teachers Journal, 25,1979, No. 2, pp.74-80.
3 tabs.

The article describes the findings of a project which aimed at determining whether students who major either in art or in natural science differ in their attitudes. An epistemiological questionnaire was used and respondents included both students and members of the teaching staff. The data obtained was statistically assessed and summed up in tables. Answers of the type "how things are" and those of the type "how things should be" were distinguished. The article describes in detail the differences in attitude between both types of students, as well as their answers to individual questions /concerning the characteristics of the natural sciences, errors as a source of learning, opinions concerning some theories, etc./. In the majority of answers, marked differences were found to exist between students majoring in the sciences and those majoring in the arts, at a level of conclusiveness of 0,10.

8.8

275. CUSIMANO, V.J. - HALPERN, S.: Science Forum II: Bioethics.

The American Biology Teacher, 41, 1979, No.4, pp.234-237; 256.3 tabs.

The authors here continue in a discussion of problems found in an article published in 1977 where they acquainted readers with a teaching method called Science Forum. Here they apply this method to botany teaching. First various elements needed for understanding the whole problem are defined. Students should become acquainted not only with the special aspect of the problem, but also with its legal, economic, social and political aspects. The example of DNA is cited in detail. During the course of a research project on this problem the authors administered seven different questionnairs to secondary school students. The questions concerned the ethical aspects of various problems, which were accompanied by a bibliography on the given subject. After the literature had been read, students participated in a Science Forum with discussions among each other and also with specialists in the particular field.

8.8

276. HISKINS, B.B.: Sensitizing Introductory Biology Students to Bioethics Issues.

The American Biology Teacher, 41, 1979, No.3, pp.151-153, 188.

The author here continues in a discussion of problems already discussed in a previous article where lectures, laboratory work and discussions were described, which all aimed at arousing among students an interest in contraversial problems, especially in the area of bioethics /one such study was published in this journal in 1977/. In the present article the author acquaints the reader with the responses provoked by the cited examples. She comments a on various bioethical problems, which students attempted to solve. All concerned experiments with animals and such problems as whether it is less grave to destroy microorganisms, algae and lower invertebrates during experiments, than to destroy vertebrates and why this should be so, and whether during school experiments pupils should study on the basis of audio-visual aids, computer models and outdoor field excursions, or experiments with living animals. In conclusion the author makes comments on various situations and asks teachers to adhere to specific guidelines when planning laboratory excercises.

8.8

277. HOWELL, D.C.: Meteorology - An Interdisciplinary Base for Science Learning.

The Science Teacher, 47, 1980, No.2, pp.14-17. 1 fig.

Six years ago the secondary school in Deerfield began to teach the foundations of meteorology as part of the science course. The article describes the outcome of this teaching and enumerates the educational and teaching gains achieved; meteorology was found to be a universal science which includes basic concepts from physics, chemistry, biology, geology and astronomy. Teaching contributes to developing the observation abilities of students and to the gaining of knowledge which is useful for various purposes in practical life.

8.8

278. KIEFFER, G.H.: Can Bioethics be Taught ?

The American Biology Teacher, 41, 1979, No.3, pp.176-180.
2 figs.

The present is characterized by revolutionary changes taking place in the relation between society and the natural sciences, which play an increasingly important role in the history of mankind. But this brings with it a number of ethical problems. In the author´s opinion, bioethics should form a part of the modern biology school curriculum. In defining the methodology of ethics, the author´s point of departure is a definition of values such as goodness, which is based on specific priorities and rational considerations and which determines the direction of human activities and supports strong emotions or intensive attitudes. In the article the authors deals with various aspects of bioethics as normative ethics and methods of studying contraversial points, etc.

8.8

279. KOSTOVA, Z. - GEORGIYEVA, N.: Biologiya i matematika v uchilishche /Biology and mathematics in school./

Biologiya i khimiya, 23, 1980, No.5, pp.21-28.

When pupils independently solve problems found in the biology syllabus they themselves accept the need to use mathematics.

The use of mathematical methods in biology should be introduced in several stages, which include: the systematization of acquired data and its representation with the aid of tables, graphs, diagrams, etc.; the statistical processing of data; an analysis of findings in relation to biological laws.

The authors cite examples of such procedures when mathematical methods are used in biology, which concern a study of variability and heredity in the seeds of beans or studying the intensity of respiration among their classmates.

8.8

280. LABIANCE, D.A.: Toxicology for the Nonscience Major in the Context of Interdisciplinary Study.

Science Education, 62, 1978, No.4, pp.491-495.

The author, who has taught chemistry to nonscience majors, has encountered the need to arouse and maintain the interest of students in the subject. Toxicology provides an opportunity for this. The author concentrated especially on the toxicology of thalium, one of the poisonous heavy metals. He discusses these problems in the context of the literature available on the subject and the structure of the course, to which 15 weeks were devoted. Besides an introduction, the course includes lectures on atom theory, chemical bonding, the foundations of orgenic chemistry, pharmacology and toxicology. Other lectures concern the energy crisis, the use of pestacides and air pollution. In the final part of the course, examinations take place. The author also discusses the role of the teacher in this course and the reaction of the students.

8.8

281. MAKSIMOVA, V.N.: Mezhpredmetniy kompleksniy seminar "Dvizheniye krovi po sosudam". /A complex interdisciplinary seminar on "The flow of blood in the blood vessels"./ Biologiya v shkole, 54, 1980, No.5, pp.51-56.

The author cites the example of a very productive form of teaching, which particularly stresses interdisciplinary relations between biology and physics. Pupils prepare independently their papers on specific topics; their papers are prepared on the basis of using the textbook and other literature on the subject. The seminar can be organised within 2 teaching lessons, with the following specifications:

aim of seminar: forming pupils´ notions concerning the specific aspect of the movement of blood in the blood vessels, on the basis of knowledge gained in the physics course on pressure and speed of movement;

tasks; - educational - learning the laws of movement of blood; - developmental - developing the cognitive interests of pupils and their skills in utilizing knowledge gained in other teaching subjects; learning skills in measuring blood pressure;

- educational - forming a dialectical and materialistic world outlook and convictions concerning the material essence and recognizability of the world.

Approximately 2 weeks before the seminar, pupils obtain their assignments, which belong to one of 7 different groups of topics: The history of discoveries concerning blood; Pressure and its measurement; Blood pressure; The resistence of vessel walls; Speed and unity of measurement; Work and the activity of body organs and the significance of movement for blood distribution; Regulation of vessel internal diameter.

The contribution made by the seminar can be formulated as a development of pupils' skills to actively use knowledge from other teaching subjects.

8.8

282. PETERSEN, P.: "Werte und Normen" aus naturwissenschaftliche Sicht - Der Mensch als Teil der Natur./"Values and standards" from a nature science point of view - Man as a part of nature./

Der Mathematische und Naturwissenschaftliche Unterricht, 33, 1980, No.7, pp. 421-429. 5 figs.

The author describes a course in the philosophy of the natural sciences which she organized with pupils in the 11th to 13th classes of a general education secondary school. In the course those problems which lead to an understanding of the foundations of the natural sciences were explained - including basic philosophical knowledge. For this purpose she used the ideas of Plato /427-347 B.C./, Empedocles /490-430 B.C./, Plotinus /205-270 A.D. in Egypt/, E. Kant /1724-1804/, as well as quotations from the Bible, Buddha, Kant, Lorenz, etc. She acquainted pupils with the evolution of human knowledge and the new quality of human evolution - cultural evolution. She also points out the discrepancy which exists between cultural evolution and genetics and the existing dangers to humans which follow from overpopulation and the possibility of the self-destruction of the human race.

8.8

283. RASHKOVA, S. - PETKOVA, M.: Osshchestvyavane na mezhdupredmetni vrzkiiizpolzuvane na nagledni posobiya v kurse po yestestvoznaniye v IV. klas./The use of interdisciplinary relations and the use of ostensive aids in the natural science course in the 4th class./

Biologiya i khimiya, 21, 1980, No.2, pp.52-59.

The authors provide a detailed survey of the natural science syllabus for the 4th class, which is summed up in the form of a table and includes references to topics in other teaching subjects to which the topics taught are related, and notes on available teaching media which the teacher should use when teaching these topics.

The tables represent a supplement to the syllabus and serve as an effective aid to teachers who can look for the needed teaching aids in advance and prepare their teaching lesson from the point of view of interdisciplinary relations.

8.8

284. RYAN, F.L.: Science and the Humanities:An Attempt at Integration.

The American Biology Teacher, 41, 1979, No.2, pp.101-105. 2 figs.

The author in this article considers the fact that the sciences and the humanities are often sharply divided in a single school. As a teacher he has attempted to integrate both courses. In the introduction, the author enters into a discussion with an article by W. Poznar who expressed his opinion concerning the situation in the study of the humanities and the causes of the traditional lack of agreement among natural scientists and specialists in the humanities. The author attempts to define those characteristic signs according to which specific science or theory is included into one or the other group. He considers Hansen's conclusions on the methods of scientific research. In the author's opinion it is wrong to strengthen in students the notion of a clear and marked dividing line between the natural sciences and the humanities. He documents this on the basis of his conviction of common thought procedures used in both areas, as well as by the need to often use in the natural sciences procedures which are borrowed from elsewhere /for instance literary theory/.

8.8

285. SEHMRAU, W.: Zur Mutzung der Beziehungen zwischen dem Biologieunterricht und dem Chemiunterricht. /On the utilization of relations between biology teaching and chemistry teaching./

Biologie in der Schule, 29, 1980, No.10, pp.418-424. 5 figs.

From an analysis of interdisciplinary relations, the author comes to the conclusion that the following negative phenomena exist: in teaching physiology in the 8th and 10th classes, insufficient use is made of knowledge gained in chemistry; this concerns skills and abilities in observations and in doing experiments; problem teaching is insufficiently made use of; pupils are not sufficiently convinced that they are capable of explaining many biological phenomena on the basis of knowledge in chemistry; polytechnical education is not implemented to a sufficient degree. The correct use of interdisciplinary relations is demonstrated by the author on the basis of the topic photosynthesis. In teaching he makes extensive use of diagrams and problem teaching methods.

8.8
286. SZABÓ, G.: Népművészeti ismeretek felhasználása az élővilág tanításában. /The use of folk art in teaching "living nature"./

A biológia tanítása, 19, 1980, No.2, pp.42-47.

In the author's opinion, various aspects of folk art can be made use of in biology teaching. She describes the use or incidence of various natural objects in folk art. On the basis of several examples she shows how biological interpretations can be used to understand folk art. The purpose of the article is not to advocate changing biology lessons into art lessons, but only to increase the interest of pupils, to lead them to a complex approach to nature and to make a biology lesson more interesting.

8.9
287. COBLE, C.R. - HOUNSHELL, P.B.: A Framework for Evaluating Chemical Hazards.

The Science Teacher, 47, 1980, No.3, pp.36-40.

The authors have prepared a survey and evaluation of harmful chemicals which present a health hazard and which are used in school laboratories. They concentrate especially on carcinogenic substances and substances which are dangerous because of their influence on internal body organs, especially for women in pregnancy. A very laudable article which all teachers of chemistry and biology should become acquianted with.

8.9

288. WAGNER, D.: Zur Anwendung des Gesetzes über den Verkehr mit Giften in den Schulen und Einrichtungen der Volksbildung. /On the use of the law concerning the use of poisons in schools and educational institutions./ Biologie in der Schule, 29, 1980, No.2/3, pp.115-122.

This article is a reprint from the journal Chemie in der Schule. The author first defines the term "poison" and divides poisons into two groups /highly poisonous and poisonous substances/. The use of highly poisonous substance in schools is forbidden. The principles of using gaseous substances are cited and a survey of legal standards is provided from the point of view of safety measures.

9

289. BYERS, C.R.: Using a Role-Playing Game to Teach Ecology . The American Biology Teacher, 41, 1979, No.9, pp.540-543. 1 fig.

The article describes a project in ecology teaching which uses games for teaching. The purpose of the game is to provide students with an understanding of ecological problems which they may encounter in real life and how they can be solved. The principle of the game is the forming of a hypothetical community called "Ecotown". Students receive a map and a description of the whole area which is situated into an actually existing territory, which the students are well acquainted with.

The class is then divided into groups, which represent various strata in Ecotown. Each group receives cards with the aims specific for the group written on them and arguments in favour of these aims. They then approach a "planning group". The article describes the aims and arguments of five different groups and the planning group. In conclusion, the author sums up instructions for the teacher, which concern especially suitable motivation for the students. The purpose of the game is to open a discussion and within its framework to acquaint students with some of the problems of ecology.

9.4
290. WRIGHT, J.L.; The Novel as a Device for Motivating Junior High Science Students.

The American Biology Teacher, 41, 1979, No.8, pp.502-504.

In the article the author deals with the problem of suitable motivation of students in biology teaching. He cites some methods used, such as the threat of subsequent tests, the use of explained facts for the solution of a situation or problem, etc. All these methods are not among the best. He suggests the inclusion of novels with nature topics as a very good source of motivation for younger students. As a specific examples he cites Julia Among the Wolves by J.G. George. The book takes place in Alaska and is about an Eskymo girl who is lost in the tundra and taken care of by a wolf pack. A discussion on the novel will support in children both cognitive and emotional development. On this basis it is possible to organize various activities such as a panel discussion, a field excursion, etc. A novel can also serve as a stimulus for examining the attitude of students towards their environment, etc.

9.5
291. PERRY, C.M.: Questions.

The American Biology Teacher, 41, 1979, No.6, pp.360-362.

The author considers the problem of questions which a teacher encounters every day. She attempts to sum up several principles which teachers should be guided by when answering questions. Also students should be given enough time to be able to think about their answer to a question. After an answer has been given, the student should be given the opportunity of asking a further question. A teacher should not answer his own questions , because this surpresses the activity of students. It is not always necessary to call upon one student to answer a question, it is much better to give a number of volunteers the opportunity to answer. Students should be able to answer out loud. In a case when the reply is almost, but not entirely correct, it is best to guide the student towards a better answer by giving him supplementary questions. The author also discusses various types of suitable questions, which should provide motivation to pupils and support their ability to analyse, use and assess the knowledge they have.

9.6
292. BANHAM, P.: Identification of Saltmarsh Flowering Plants.

Natural Science in Schools, 17, 1979, No.1, pp. 17-20.
21 figs.

The article is actually a picture atlas which can be used for identifying flowering marine plants which grow in salt marshes and other marine environments. The pictures are accompanied by texts which include the

English and Latin names of the plants and their brief characteristic - including the colour of their flowers, time of blooming, where they are found and other typical interesting information. The group includes monocotyledones and dicotyledones in a total of 21 species. They include the genera Cochlearia, Spergularia, Suaeda, Salicornia, Limonium, Armeria, Blaux, Plantago, Inula, Aster, Artemisia, Triglochin, Juncus, Festuca, Puccinellia, Agropyroh and Spartina.

9.6
293. BROVKINA, Y.T. - REZNIKOVA, V.Z.: *Pormirovanie u shkol - nikov umeniya rabotat s uchebnikom biologii.* /Teaching pupils skills needed for work with the biology textbook./ Biologiya v shkole, 54, 1980, No.6, pp.34-38.

If pupils are to work properly with a textbook, they must first be gradually trained to do so. This skill should be learnt by advancing from simple tasks to more complex ones and should include learning to work with the index, learning to describe pictures found in the textbook, etc. In the zoology textbook the pupils should learn how to use the "Brief Characteristics of Basic Phylla and Classes of Animals" and the index of basic terms. A number of textbooks can also be used for laboratory excercises and this has a positive influence on the development of independent cognitive skills of pupils, which includes the independent finding of fundamental ideas, learning to answer questions correctly, drawing up tables or taking notes on a specific topic. The general requirement of skills in working with a textbook is demonstrated on the basis of the example of topic The Nutrition of an Amoeba.

9.6
294. FAUSTUS, L.: Určování rostlin podle Botanického klíče /Faustus, L. - Polívka, F./ /The identification of plants according to a Key to Flora by L.Faustus and F. Polívka./ Přírodní vědy ve škole, 11, 1979-1980, No.10, pp.366-367.

The Key to Flora by the above cited authors has been written for the use of basic school pupils; the present article aims at helping teachers to prepare their lesson on the use of the Key according to the new biology syllabus. The model for this new Key was the tried and true but now already obsolete Key written by Polívka, which was structured for didactical, not scientific purposes. The teacher should lead his pupils to examine the plant as a whole when using the Key, because essential diacritical marks can be found even in base leafs. The Key usually does not require the examination of underground parts of a plant, so that it is not necessary to destroy the whole plant when studying it. The pupils are asked to notice various developmental characteristics of a plant.

9.6
295. GULLIVER, R.L.: Natural History Articles in 1977. Natural Science in Schools, 17, 1979, No.1, pp.13-16, 21-24.

The article provides a survey of articles on natural history published in 1977 in nine selected periodicals. The survey is written not only for those intereaed in biology, but also as an aid for basic and secondary school teachers, who will be able to use some of the articles as teaching topics. Such articles can also serve as the basis for various excercises done with students. The citations are divided according to subject-matter, not according to authors. The author of the article distinguishes several groups of topics, including plants, invertebrates, birds /according to specie and according to the subject-matter of the article/ and mammals. Within these groups there is always an alphabetical list of key terms, which express the general topic. The citation includes date of publication, name of article, its author and number of pages.

9.6
296. GULLIVER, R.L.: Natural History Articles in 1978. Natural Science in Schools, 17, 1979, No.3, pp.81-88.

The author provides a survey of articles concerning natural history published in selected periodicals in 1978. A similar survey was also published for 1977 /in No.1, 1979/. However, the selection of periodicals has been somewhat changed and the survey includes a larger number of interdisciplinary topics, as well as a brief bibliographical section. The articles are again divided according to subject-matter and within each topic the articles are classified in alphabetical order according to key words which are representative of their subject-matter. Besides the name of the article, the name of the author, also a brief characteristic of the article is provided. The basic subject-matter topics are the following: I. plants, II. invertebrates, III. birds /according to specie/, IV. birds /according to subject-matter of article/, V. mammals, VI. other vertebrates, VII. general biology.

9.6

297. KISS, F.: A kõnyv szerepe az õpallò ismretszerzésben.
/The role of books in independent learning./
A biológia tanítása, 19, 1980, No.1, pp.26-31.

In the article the author concentrates on the relation between a person and books, the development of this relation in the life of a person and especially the development of a person as the outcome of this interaction.

The author stresses the need for immediate contacts between a person and books, from childhood onwards. The development stages of the person should be taken into account. In the author's opinion, basic school pupils should not be asked to work with encyclopedias and catalogues, but rather they should be able to leaf through books, look at them and find what interests them. This supports the development of an interest in books.

Catalogues, dictionaries and encyclopedias are too concentrated and factual and therefore can be boring for children who do not have sufficient positive motivation for working with them. The author discusses in detail the various stages of development of pupils as readers and discusses the literature suitable for each stage. A reader should first become acquainted with books which contain pictures, which can be copied and confronted with what is seen in nature during excursions. During various manual activities, including experiments, the transition should be made from pictures which provide instructions on how to procede, to written instructions. Only afterwards, when the pupil is ready to verify the correctness of what has been learnt, should he or she begin to use dictionaries, encyclopedias and catalogues.

When these gradual steps are not used, a situation can arise where a pupil acquires dictionary type knowledge without any practical experience; such knowledge is rapidly forgotten. It is important to always stress the connection between what is written or shown in books and what actually exists /positive motivation/. The role of the teacher is to correctly guide the development of a young reader so that he procedes is a correct manner in the acquisition of knowledge.

9.6

298. McELROY, A.R. - McNAUGHTON, F.C.: A project-based approach to the use of biological literature.

Journal of Biological Education, 13, 1979, No.1, pp.52-57. 2 tabs.

The authors describe a course which has been designed for the purpose of improving students' skills in the use of specialized literature concerning the natural sciences, which would also teach them to take notes in an acceptable form. The subject-matter and methodology of the course differs from others on this subject, especially in that it concentrates on general work with literature, rather than on the gaining of information as such. It was found that the course found a large response and according to available findings was found to be very effective. Students now tend to use literary sources much more frequently and the quality of their written work has markedly improved. The skills which students acquired during the course also help them in their other academic work. The course described can also be applied to other educational programs where the study of literature is important.

9.7
299. BEALER, J.N.: Classroom Study of the Diet of a Barn Owl.

The American Biology Teacher, 42, 1980, No.6, pp.342-344. 4 figs.

A study of the diet of animals is an important part of the ecology course. Since such studies undertaken outdoors would require much time and would also present other difficulties, the author therefore suggests a classroom project in which pellets of some of the smaller species of owls are studied in the laboratory. The pellets should be placed in small jars and labled with data concerning the date and site of their collection. Then they can be taken apart and their content noted in the form of a table. On the basis of undigested food it is possible to judge which animals are the prey of owls, which animals they prefere, etc.

9.7
300. BRENNEMAN, J.A.: Laboratory Observations of Lower Fungi.

The American Biology Teacher, 41, 1979, No.1, pp.21-23. 6 figs.

In spite of the fact that fungi are very interesting both from the point of view of their structure and their physiology, they are among the least studied organisms and are hardly ever used in biology teaching. In this article the author described his own experiences with the use of the lower fungi in laboratory excercises. He has found Oomycetes and Zygomycetes as the most suitable species, which can easily be obtain from natural sources and cultivated at room temperatures. He describes both groups separately and provides a general characteristic of each group, its most suitable representatives and the conditions needed for its cultivation. Also suggestions for observations and experiments are described. Added to the article are micro-photographs of some of the species discussed and of their spores.

9.7
301. BUKATSCH, F.: Hydrographie von Blättern - eine Art Naturselbstdrucke. /The hydrography of leaves - a type of natural printing./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.6, pp.184-186. 2 figs.

In the autumn we can often see how fallen wet leaves leave brown outlines on the light-coloured background of stones. These are in fact perfect prints of the leaves. In the majority of cases the outline is made by the leaching of tanning material. This tanning material in the fallen leaves also prevents or slows down the disintegrating processes caused by bacteria and slows down the decomposition of the leaves. Some time ago photographs have been made by placing green leaves on negative film; the process of photosynthesis causes the development of lighted starch particles, which can be coloured with a Lugol solution after the green pigment has been extracted from the leaf by washing in warm alcohol. Instructions for the making of such photographs can be found in an article by H.Mollisch. Pupils can use the imprints of the leaves found on pavements or stones. If such a dry print is rubbed with a solution of iron trichloride it will, after some time, take on a blue-brown colour. This can be considered proof of the presence of tanning material leached from the leaves. The author describes tan as a chemical substance, describes its characteristics and how its presence can be chemically proven. He also explains the importance of tanning substances for microflora found in the soil, for bacteria and the lower fungi in the forming of humus.

9.7
302. CLARKSON, J.: Learning From our Illusions.

Natural Science in Schools, 18, 1980, No.1, pp.9-11.
7 figs.

The author discusses various optical illusions, especially those concerning various lines. Changes in length, changes of angle, various colours provoke illusions of various sizes, in spite of the fact that the actual length of the line does not change. On the basis of such examples the author explains a theory of illusions and the knowledge which can be derived from them; he also stresses the need to make precise measurements, because our eyes can easily decisive us.

9.7

303. DAWES, J.A. - KING, M.R.: A Constant-Temperature Observation Chamber for Use with Microscopic Organisms.

Journal of Biological Education, 13, 1979, No.3, pp.171-178. 5 figs., 1 tab.

The instrument described by the authors was made in view of the need to determine normal heart activity at rest in freshly hatched fry from various related fish. The observation chamber is made of vinyl walls with a glass floor, so that when placed under a microscope its content can be illuminated from below. In the introductory parts of the article the general principles upon which such an apparatus is built are described. Then detailed instructions for its construction are given. The authors also describe some opportunities for observations. The article is supplemented with sketches and drawings.

9.7

304. FREYBERG, L.: Objektbetrauchtungen im Biologieunterricht: eine fachspezifische Arbeitsweise. /The observation of objects in biology teaching-specifically adapted methods of work./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No. 3, pp.93-94. 1 fig.

The author discusses opportunities for and the significance of observations of natural objects in biology teaching. This is important not only from the point of view of the didactical principle of ostensiveness but also for carrying out independent work by pupils and their training in the use of basic scientific methods in biology. The main part of the article concerns methods of work with experiments and observations. The author discusses what should be observed, how, when and why experiments should be undertaken. He divides observations into those which lead to a determination of the outer structure of a body, its habitat and structure and those which concern learning about the functioning of a phenomenon. If a pupil is to carry out an experiment and observation properly, he must be given clear and comprehensible instructions and he must have sufficient time for the experiment itself and its observation. Both the experiment and the observation should be assessed before the project is completed.

9.7
305. GILBERT, F.S.: Flower Visiting by Hover Flies /Syrphidae/.

Journal of Biological Education, 14, 1980, No.1, pp. 70-74.
1 fig.

The author has developed for school needs a method for the observation of ten different species of hover flies which almost uniquely find their food on flowers. He has also chosen 5 specific flowers for observation. He compares the relation between the length of mouth parts of eight species of hover flies and the depth of the crown of the flower they visit. On this basis the author calculates the frequencay of visits of the selected flowers in a half hour and during a ten hour period. Other factors, such as the climate, temperature, the sweetness of the nectar and others are also discussed in relation to the frequency of visits of the hover flies to flowers.

9.7

306. GURLEY-FELLARS, L.: Animal Behaviour: Adding Excitment to High School Biology Programs.

The American Biology Teacher, 42, 1980, No.3, pp.177-179 and 179.

A study of biology without a study of animal behaviour would be incomplete. This subject matter serves to fill in the theoretical and practical knowledge gained by the student and makes it possible to achieve a better understanding of the biosphere, as well as acquiring better observation skills, which are important for the later study of science. A study of animal behaviour includes a number of aspects of general biology, such as endocrinology, ecology, communication theory and social organization. The program which the author describes in his article explains how and what to teach and how to continue in observations; it stresses those aspects which students should be able to see for themselves.

9.7

307. HAWK, J. - GRADZIEL, T.M.- CROWDER, L.V.: Teaching Principles of Linkage and Gene Mapping with the Tomato.

The American Biology Teacher, 42, 1980, No.1, pp. 16-22.
5 figs.

Theoretical explanations of the principles of heredity can be practically demonstrated by experiments with the cultivation of the tomato. On their basis, students can achieve an understanding of the basic theory of heredity, as well as the techniques of keeping records, making charts and undertaking genetic analysis.

9.7
308. HOITSY, G. - HORVATH, L.: Ivarsejtek nyerése kecskebékából. /Obtaining sexual cells from frogs./

A biológia tanítása, 19, 1980, No.1, pp.23-25.
1 tab.

The authors describe opportunities and methods used for catching frogs from water areas used for specific purposes. Elsewhere amphibians are protected by the law. The best time for catching frogs is the autumn, when they can easily be caught in fish ponds which have been drained and when gonadotropic hormones have accumulated in the hypophysis of the frog. The authors go on to describe in detail how to procede: hormonal induction, artificial insemination and the observation of frogs with binoculars. In the final part of the article the authors provide a table which describes the development of the frog from conception until the end of the period of metamorphosis.

9.7
309. HOWELLS, K.F. - BELL, D.A.: Quantitative Aspects of Cyclosis in Plant Cells.

Journal of Biology Education, 13, 1979, No.2, pp. 86-90.

The movement of protoplasma /cyclosis/ in plant cells was for long understood as a purely qualitative excercise during microscopy. But with the use of a simple formula we are able to determine the energy aspects of the process /including for instance the hydrolysis of ATP/ and its relation to the general energy balance of the plant cell. The article describes an excercise in which an integration of physical and chemical principles is carried out in the course of microscopy observations. The leaves of various species of the genus Funaria and the specie Elodea canadensis are suitable material which makes it possible to follow the cyclosis of chloroplasts. Students measure the mean diameter and thickness of chloroplasts, their average speed and the total number of chloroplasts found in a single cell. They also calculate the number of ATP molecules hydrolyzed per second and which parts of the ATP produced photo-phosphorylation this number represents.

9.7

310. HURST, T.M.: Was I Right ? Testing Observations Against Predictions in Mendelian Genetics.

The American Biology Teacher, 41, 1979, No.2, pp. 94-97.
4 tabs.

When students are to carry out experiments in Mendelian genetics in a scientific manner they encounter the problem of comparing the outcome of their observations with their original predictions. In this article the author attempts to acquaint the reader with two versions of comparative approaches based on a X^2 test and upon standard deviations. The author prefers the latter method which is used in the computer programs SABLE and GENIE. Both methods are analysed in detail and illustrated by various examples. For the Chi-square method a formula is cited according to which the degree of reliability is calculated. The difficulties encountered are discussed. In conclusion the author sums up the recommended procedure in which a comparison with a prediction is carried out with the help of an assessment scale of 5.

9.7

311. YEREMEYEV, V.A. - LIVSHITS, O.D.: Demonstratsiya izmeneniya davleniya i skorosti dvizheniya krovi po sosudam. /Demonstrating changes in pressure and the speed of movement of blood in the vessels./

Biologiya v shkole, 54, 1980, No.5, p.35.

With the aid of a simple demonstration apparatus made up of the three rubber tubes /which represent blood vessels/, 3 retorts with water of various colours with rubber stops through which glass tubes pass /with a pressure gauge attached/ and an outlet into a dish with water /from the speed of the bubbles coming out of the system it is possible to estimate the speed of "blood" movement in the model and thus in a simplified form the pressure and speed of blood movement in the blood vessels/. Compressing the air in the model with a rubber inflater imitates cardiac systolic movement.

9.7
312. JONES, A.R.: Using a Ciliate Protozoan Vorticella in Teaching.

Journal of Biological Education, 14, 1980, No.2, pp. 119-126.
5 figs.

In comparison to other ciliata, vorticella are much better suited for school instruction. They are fixed by a stem to a solid area, they are easy to cultivate and they can easily be found in the majority of waters. When the vorticella is cultivated on a slide it is easy to observe. The author describes the method of collection, its cultivation, observation and the mounting of permanent specimens. He suggests a number of experiments aimed at observing its growth, reproduction, colonization, adaptation and ecological factors, accepting food and osmoregulation.

9.7
313. KORDAN, H.A. - MUMFORD, P.M.: Comparative Actions of Barbiturates Studied by Pollen Grain Germination.

Journal of Biological Education, 13, 1979, No.2, pp. 102-106.
1 fig., 1 tab.

The article describes a simple experimental system which serves to demonstrate the long-term, short-term and medium-term effects of barbiturates. Pollen grains are used, which besides other aspects can also serve as a biological test. Observations take place with the aid of an optical microscope. The described experimental system yields findings which are easily attainable and can easily be reproduced. Besides this, this experimental system makes it also possible to demonstrate the Meyer-Overton principle concerning the solvency of fats in dependency on the potential of a drug or anesthetic administered to humans or animals. In this case haploid microscopical plant material is used.

9.7
314. KUPRIYANOVA, M.K.: Zimniye fenologicheskiye nablyudeniya. /Winter phenological observations./

Biologiya v shkole, 54, 1980, No.1, pp.56-62.
6 figs.

The author suggests assignments for various grades:
Vth class: 1/ observation of increments or losses in snow cover,
2/ a study of the protective functions of snow.
VIth class: 1/ measuring the thickness of ice,
2/ observations of shrubs and trees in winter.
VIIth class: 1/ measuring the thickness of the snow cover in various parts of landscape,
2/ determining the degree of pollution of snow,
3/ observations of animals in the winter.
The outcome of the observations can be used not only within the school, but also in extra-curricula activities.

9.7

315. KUPRIYANOVA, M.K. - SHCHENNIKOVA, Z.G.: Vesenniye fenologicheskiye nablyudeniya. /Spring phenological observations./

Biologiya v shkole, 54, 1980, No.2, pp.64-69.
3 figs.

The advantage of spring observations is the fact that they can all be undertaken under the direct supervision of the teacher. Examples:

Vth class: 1/ determination of links between the phenological situation of various objects in nature,
2/ observation of the greening of a birch tree on the basis of an integrated descriptive method.
VIth class: 1/ drawing up a complex phenological characteristic of nature on the day of the excursion,
2/ drawing up a phenological characteristic of the phytocenosis.
VIIth class: 1/ phenological description of the beginnings of the greening of a birch tree with the utilization of an integrated descriptive method.

9.7

316. LEWIS, G. - THOMAS, T.: An Approach to Rocky Shore Ecology.

Natural Science in Schools, 18, 1980, No.1, pp.3-8.
5 figs.

Rocky and steep sea shores or the shores of lakes are a good place to observe insects, animals and plants.

The authors provide instructions on how, with the aid of simple, essentially amature tools, it is possible to carry out observations of conditions existing on the shoreline. He also discusses how to keep records of such excursions and make diagrams. This is a suitable topic for students in the upper classes of basic school.

9.7
317. LICITA, K.: Writing is Part of Literature,Too!
The Science Teacher, 47, 1980, pp.24-26.
1 fig.

It is very difficult to express correctly and in a comprehensive manner the reality which has been the object of observation, in spite of the fact that clear and logical expression is a prerequisite for any specialized or scientific work. The article describes excercises in various methods of expression in writing, including narration and description; it also discusses the type of expression used in textbooks, purely scientific literature, etc.

9.7
318. MANDEL, A.: Investigating the Microclimate of a Shopping Mall.
The Science Teacher, 47, 1980, No.4, pp.28-39.
3 figs.

The so-called "hothouse effect" which arises over large urban concentrations and has a negative effect on the whole climate of urban agglomerations has already been examined and described. In this article the author provides instructions for a school project to study the microclimate of a shopping mall, which often represents a mini-city in itself. The teacher and his students first chose a suitable place and for a period of time they carried out measurements of temperature and humidity about 1 yard above the ground. On the basis of this data an isotherm map was drawn which was modified for various seasons and various weather conditions.

9.7
319. MYAGKOVA, A.N. - DERZHAVINA, T.B.: Rol nablyudeniy v povisheniyi effektivnosti uroka obshchey biologii.
/The role of observations in improving the effectiveness of teaching lessons in general biology./

Biologiya v shkole, 54, 1980, No.3, pp.28-32.

The method of observation is of great importance for learning specific factual knowledge and enriching the memory with visual images. It helps the pupils to learn to use analytical and synthetic procedures. Its effectiveness depends on the correct supervision of cognitive activities by pupils. The use of brief detailed instructions, orientation cards, outlines and tables is described. A generalization of the factual knowledge obtained makes it possible to do away with formalism and to increase the precision of the knowledge gained. The article describes three examples of the utilization of observations:
1. During a spring excursion in the 10th class - when learning the topic The Biocenosis - groups of pupils undertake independent observations at a predetermined site.
2. In the 9th class - when learning the topic The Species - Their Criteria and Structure - the pupils observe 4 different species of Stellaria.

3. In the 9th class - when learning the topic concerning the main forces of evolution of cultivated plants - the pupils observe items described in a herbarium on the basis of the example of wheat and barley. Their observations are written into a comparative table. In conclusion the authors stress that the outcome depends on how well we have taubht pupils to observe.

9.7
320. MORRIS, L.: Waves on the Shore.

Natural Science in the Schools, 18, 1980, No.2, pp.40-42.
8 figs.

A study of waves is an important subject for all those who study naval subjects or build shoreline structures. The author describes the theory of sea waves in a simplified form, explains basic terms and the impact which waves make on the coast, the role of the wind,etc. Also what waves do is described /they move huge quantities of sand, boulders, etc./ and the effect these movements have on costal structures or the influence they have on the lives of people living in costal areas.

9.7
321. MÜLLER, A.: Beobachtungen und Experimente an lebeden Tieren /II/. /Observations and experiments with living animals. II./
Biologie in der Schule, 29, 1980, No.5, pp.209-213.
4 figs., 1 tab.

The article desscribes the following experiments: proof of oxygen consumption by aquatic animals /guppy fish/, determining the sensory organs of the drosophila fly and the yellow mealworm /Tenebria/ reacting to light, determining the smell organs of the yellow mealworm and the behaviour of the Golden hamster in a labyrinth. For each experiment the author describes preparations, the objects needed, apparatus and chemicals, how to carry the experiment out and how it should be assessed. She also cites examples of tables made to record the findings of the experiments and how an outline of the experiment should be written.

9.7
322. O'NEIL - HOLDEN - BARROW: Measuring the Heat Content of Wood.

The Science Teacher, 48, 1981, No.1, pp.36-37.
2 figs.

The heat content of various species of wood can be determined in the laboratory with simple means. Soft and hard wood are used for the experiment, pieces of freshly cut wood and methanol as a burning medium. Temperatures are measured with thermometers /from -10° to 110°C/ over a fireproof crucible protected with an adapted empty food tin. Because individual findings can differ on the basis of the quality of the experiment itself, it is necessary to calculate average findings for several experiments. The findings should be written into a table which is also described by the authors.

9.7

323. PAZOUREK, J.: Pozorování primárních krycích pletiv.
/The observation of primary protective tissue./

Přírodní vědy ve škole, 31, 1979/80, No.5, pp.162-163.
3 figs.

This is a suitable topic for botanical observations, which is not too difficult from a methodological and material point of view. To obtain the protective tissues two methods can be used. In the traditional method the surface of the leaf /of for instance a geranium plant/ is carefully cut in a slanting direction. The micro-relief method can also be used. For this, colourless nail polish and Scotch tape are needed. The nail polish is painted on the leaf and allowed to dry thoroughly. Then a piece of Scotch tape is placed over the nail polish and the surface layer of the leaf peeled off. This layer is placed on a slide and after careful focusing we can observe the sculptured surface of the leaf. By this method it is possible to study the differences in the surface structure of various leaves.

9.7

324. PISZKA, J.: Obserwacje kariologiczne komòrek cebuli.
/Cariological observations of onion cells./

Biologia w szkole, 33, 1980,No.1, pp.54-55.
3 figs.

Cariological observations make it possible to demonstrate mitosis during biology lessons, in hobby clubs and in the practical part of the school-leaving examination in secondary schools. The work itself acquaints the pupils with micro-botanical techniques. Onions are a suitable object for such observations because they have 2n = 16 chromosomes and they are available all year around. The author recommends observing mitosis in the roots of onion seedlings rather than in the more often used method of observing onion roots. The same implements are needed: 98% glacial acetic acid, 45% acetic acid, hydrochloric acid and orceine /4% orceine in 45% acetic acid/. The author describes in detail the staining of the cells, producing microscopic specimens and their use in class. The article contains 3 very good photographs.

9.7
325. PRIVAULT, D.: De l`observation à la théorie. /From observations to a theory./

Biologie,Géologie, 67, 1980, No.1, pp.98-103.

Natural scientists are beginning to take an interest in the history and philosophy of the natural sciences. As far as the methods used by science are concerned, no unity exists. Some are of the opinion that laws and theory are the direct outcome of observations, while others claim that all observations are the outcome of the preceding theory and they seek confirmation for their theories in experience. The author of the article compares both opinions in a very interesting manner and cites the opinions of various outstanding philosophers and scientists /Kant and Einstein/. He does not, however, arrive at any conclusion of his own and awaits further reactions to his article.

9.7

326. ROHDE, C.: *Erfahrungen bei der Entwicklung der Beobachtungs- und Experimentierfähigkeit der Schüller.* /Experiences with developing observation and experimental skills in pupils./

Biologie in der Schule, 29, 1980, No.10, pp.424-426.
1 fig.

In biology teaching, observations or experiments are the foundation for acquiring new knowledge in a number of lessons. The observation of a natural object or model can often develop into experiments. The author describes her own experiences with experiments on "Carbon oxide as a necessary nutritive agent in autotrophic plants" in the 9th class. 3 weeks before this topic was taught the pupils do three experiments: they observe the germination of a plant under normal conditions, in an atmosphere with a decreased content of carbon oxide and in an atmosphere with an increased carbon oxide component. The author suggest two different alternatives for teaching the lesson itself where both lead to the same outcome.

9.7

327. ROWE, M.B.: *Evaluating Student Attentiveness to Science and Technology.*

The Science Teacher, 47, 1980, No.9, pp.26-28.
3 figs.

The author describes a points system used for evaluating the degree of attentiveness of students during science and technology lessons. The author defines attentiveness as a three-dimensional phenomenon composed of being interested, gaining knowledge and obtaining information. This is evaluated by activity, exerting will power to obtain information in printed media and in discussions with others. In a diagram the author shows that greatest attentiveness among students exists between the 14th to 16th year of age.

9.7
328. SETTLE, W.Y.: Using Water Clover to Demonstrate Sexual Reproduction in Ferns.

The American Biology Teacher, 42, 1980, No.5, pp. 295-297.
4 figs.

In the majority of the higher plants, including ferns, sexual reproduction requires several weeks from the formation of spores, to the development of young sporophytes. By using maidenhair /Adiantum/, the teacher can achieve good results, but this requires precise planning if the required gametophytes are to be available in time for laboratory excercises. The author therefore recommends using water clover /Marsilea/, which does not look like a fern, but otherwise is much better suited for use in laboratory excercises. The method, which the author has been using for a number of years, is described in detail.

9.7
329. SPRAY, M.: Nature at Night.

Natural Science in Schools, 17, 1979, No.3, pp.71-76.

The article deals with the adaptation of various organisms to nocturnal lives. Nocturnalism is first described in a general manner. The darkness provides protection against natural enemies and for a number of invertebrates also the advantage of lower temperatures. Special attention is devoted to nocturnal and twilight mammals such as bats, insectivores, rodents, foxes otters, etc. Among the other vertebrates mentioned by the author are owls, several predatory birds, nightingales, as well as nocturnal amphibians. The next part of the article is devoted to nocturnal invertebrates such as moths, spiders and molluscs. General information is always supplemented with a survey of specific examples with brief characteristics and possibilities for class work and observations. In conclusion the author also mentions some "nocturnal" plants, which are pollinated by moths. He also mentions so-called nocturnal movements, for instance in the species Acacia, Mimosa and Oxalis.

9.7
330. SPRAY, M.: Nature at Night.

Natural Sciences in the Schools, 18,1980, No.1, pp. 17-21.
3 figs.

The natural environment changes at night, both for man and other fauna. The specific aspects of the night time, in contrast to day time, place special demands upon sight and smell as well as hearing, especially among animals who are visually adapted to daylight. The author discusses the scope of sensory organs in the night time, the characteristics of the environment at night time and the sense of time during the night which adults and children have. Several examples are cited for learning about the night with the aid of instruments. This article brings interesting knowledge and is also amusing. It is recommended for use in schools.

9.7
331. SUNDBERG, M.D.: Sleep Movements in Albizzia: a Study of Plant Biorhythm.

The American Biology Teacher, 42, 1980, No.2, pp.90-93 and 99.

Many students think that movement is one of the characteristics which distinguish plants and animals. The author recommends an excercise with the Albizzia /Albizzia Julibrissin/ which shown that especially plants of the pea family open their leaves during sunlight, while at night time pairs of leaves fold up together. An excercise period which examines the phenomenon of night movements of plants brings students to a deeper understanding of biological rhythms and their causes.

9.7
332. WATERS, C.: Observing the Zebra Finch.

The American Biology Teacher, 41, 1979, No.9, pp. 520-525.
7 figs.

The article describes a laboratory project in ethology. The author recommends the use of the Zebra finch on the basis of his own experiences; these birds are undemanding when kept in captivity and they are able to demonstrate a number of interesting aspects.

In the introduction the students become acquainted with basic information about the bird, its geographical distribution, main characteristics of both sexes and its needs in captivity. The observations themselves can concentrate on methods of movement, feeding habits, drinking, care of body covering, its singing and cries, reproduction /mating call, building of nest, sitting on eggs, care of young/ and agonistic behaviour. The author characterises all these traits, and discusses their causes and significance. In the case of the reproductive behaviour of the Zebra finch, as well as care for its feathers, the author describes the whole ceremony. The article also contains a number of very good photographs.

9.7

333. SZURA, M.: Pierwsza lekcjy z mikroskopem. /The first lesson with a microscope./

Biologia w szkole, 33, 1980, No.2, pp.114-116.

In Polish basic schools microscopy begins in the 6th class in the course on botany. One lesson is devoted to becoming acquainted with a microscope, its structure and the teachnique of microscopy, as well as with aids for working with various microscopical specimens. A second lesson is devoted to the making of a microscopical specimen. The author provides a detailed instruction for the work the pupil is to do, from a didactical point of view, and recommends selecting suitable botanical objects for the making of microscopical specimens. Such problems as how to place the specimen on a slide, how to place the slide under the microscope, how to correctly light the specimen and focus the microscope /the eyepiece magnification is multiplied by the magnification of the lens/ are discussed in detail. The author recommends that students observe through the microscope with both their left and right eye and compare the two. He also provides instructions on cleaning up the laboratory and putting the microscope away.

9.7

334. SHCHENNIKOVA, Z.G.: *Letnie fenologicheskiye nablyudeniya.* /Summer phenological observations./
Biologiya v shkole, 54, 1980, No.3, pp.51-55.
4 figs., 2 tabs.

The beginning of summer is characterized by full foliage on trees, the end of summer by the yellowing of birch leaves. All summer observations /especially in the Central Urals Region/ are carried out independently by pupils during their summer vacations. Examples of projects undertaken by pupils:

5th class: 1/ Observations of the phenological state of plants in various seasons,
2/ observing the sequence of development of generative organs.
6th class: 1/ Observing the seasonal development of plants on the school plot of land,
2/ observing the blooming of hip roses,
3/ forecasting the crop of wild strawberries.
7th class: 1/ Observing increments in the topmost shoots of pine trees in various ecological conditions,
2/ observing changes in increments of topmost shoots of pine trees during the summer,
3/ observing the falling of needles in pine trees.

9.7

335. **WARD, A.:** Electric Flowers.

Natural Science in the Schools, 17, 1979, No.3, pp.89-90.
4 figs.

The article describes experiments which acquaint the student with the problem of electrical charges and their characteristics. First a positive and negative charge are described, the mutual behaviour of objects with various charges, static electricity, conductors and electrical current. Among the experiments described are "electrical wind" when on the basis of the affinity of objects with opposite charges a paper flower is rotated and the conduction of electrical current, etc. With the aid of a glass bottle electrostatical attraction and repellency are demonstrated. In conclusion the author mentions various "magical tricks" which are always interesting for young children and which can also be used in lessons when the teacher wishes to explain their secret on the basis of physical laws.

9.7

336. **WARD, A.:** Physics Concepts from a Bubble.

Natural Science in the Schools, 18, 1980, No.3, pp. 72-73.
1 fig.

A brief but very clear discussion of bubbles, their development, outer shell and molecular principle, their total consistency, elasticity, roudness, rainbow colours, speed of formation and other properties, which are all explained in a physics context. This is a very attractive topic for pupils who learn about the "secrets" of a simple bubble.

9.7
337. WARD, A.: The Cage of Winds.

Natural Science in Schools, 18, 1980, No.2, pp. 37-42.

The Bernoulli principle, i.e. the theory of flows, is here applied by the author to the wing of an airplane and to a baloon. On the basis of pictures he demonstrates the role of uplift and underpressure on an object in flight. He also describes and shows on pictures a so-called cage of winds, which is a simple stand made of bricks in which a table fan is vertically attached. Gas baloons or ping pong balls will remain in the air as long as they are within reach of the wind flowing vertically from the fan. To this the author provides a brief explanation based on the Bernoulli principle of why this should be so.

9.7
338. WILLIAMS, G.J. - HARGISP, J.R. - KEMP, P.R. - CARTWRIGHT, D. - GERWICK, B.C.: Introducing the Principles of Vegetation Sampling in the Laboratory.

The American Biology Teacher, 41, 1979, No.1, pp. 14-17.
5 figs.

The traditional teaching of principles on the basis of which the quantity of vegetation is assessed usually takes place in the field, which has a number of disadvantages. The authors of the article acquaint the reader with some of their experiences with teaching an introductory ecology course which makes use of laboratory methods. Actual vegetation is replaced by a counting screen, whose design and method of use is described in detail. Individual species of vegetation are represented by various colours and symbols of various shapes. With the use of this screen the teacher can demonstrate the basic concept of ecology - population density, as well as the dominance and frequency of incidence of various species and methods of quantitatively assessing populations, etc.

9.7

339. WILKES, J.W.: Water Pollution: Monitoring the Source.
The Science Teacher, 47, 1980, No.8, pp.30-31.
1 fig.

The author describes a project to monitor water in a small river above and below the town and to assess the degree of pollution caused by agricultural chemicals. The project was undertaken with students who formed three teams: one dealing with chemical aspects, one with physical and one with biological. The aim of the whole project was to evaluate the chemical and biological activity of the water. The project aimed at teaching pupils how to organise such work, provide them with a general knowledge of the biology of the ecosystem, how to use various measurement instruments, how to precisely measure various components of the environment, how to analyse and interpret the data obtained and how to draw up a report on the findings. These are also the main aims of the field work.

9.7

340. YAYANES, S.M.: Demonstrating the Photoreversion of Seed.

The American Biology Teacher, 42, 1980, No.1, pp. 47-48.
2 figs.

In contrast to phototropism and photosynthesis in plants, which are demonstrated in the classroom often enough, photo-reversion /photomorphogeny/ and light control are often overlooked. The experiment described in the article concerns lactuca /Lactuce sativa L./ whose seeds are exposed to the light of a red bulb in a simple apparatus. By observation and the recording of all data it is possible to draw up a table on germination at various intensitics of red light.

9.8

341. ALLEN, D.W.: Using a Reaction-time Device to Introduce Students to the Oscilloscope.

The American Biology Teacher, 42, 1980, No.1, pp. 53-54 and 68.
3 figs.

Students should normally be able to use an oscilloscope. However, many students are not sure of themselves when they use one, among others because measurements with an oscilloscope are very brief. The author describes the making of an inexpensive electrical instrument with the help of which students can gain skills in the manipulation of an oscilloscope. There are several examples of operations with the apparatus.

9.8
342. BANWARTH, H. - BANWARTH-PABST, W. - BERGER, S.:
Acetabularia - ein geeignetes Objekt zur Untersuchung zellkerncytoplasmatischer Wechselwirkungen im Biologieunterricht. Teil 2: Zellkernöertragung und Kernaustausch.
/Acetabularia - a suitable object for the study of the mutual relation between the cell nucleus and cytoplasma in biology teaching - Part 2: The transfere of the cellular nucleus and exchange of nucleus./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.1, pp.41-53.
8 photos.

The importance of the cell nucleus for the cell can be experimentally studied on suitable objects which make it possible to take the nucleus out of the cell or to transfere it elsewhere.
These opportunities are provided by the sea weed acetabularia from the order Bryopsidales, which is one of the grass-green algae and looks like a small white mushroom; it is incrusted with calcium carbonate. It grows on to a substrate with rhizoids in which the young plant body has a large nucleus. The stem part grows from the rhizoids and is terminated by a cap.

The nucleus later divides and the newly developed nuclei travel to the cap, where eventually numerous gametes are formed in separate chambers. The young plants with large nuclei in the rhizoids are of two different shapes and are a suitable object for the study of the influence of the nucleus on the forming of the cylidrical plant body of the algae during its subsequent ontogeny. The problem can also be studied on grafts. Here also the development of the active part of the cell as the nucleus-less remnant makes it possible to demonstrate the influence of the cell nucleus on those parts of the organism which have been grafted. Already the classical experiments with the transplantations of Acetabularia /Hämmerling, 1943/ have proven the importance of the nucleus for the cell. Genes which are specific for the shape and function of the cell are found in the nucleus. Either rhizoids are replaced by the cell nucleus /transplantation/ or the cell nucleus is isolated, pried lose from the surrounding cytoplasma and replaced /implantation/. The author describes different experiments, such as for instance one which demonstrates the influence of the cellular nucleus on those parts of the cell which do not devèlop, and others concerning the formation of a cap with a specific shape, the characteristics of protein, the influence of the transmission of the nucleus on the course of develòpment of the cell, influencing the development of a cellular nucleus by adding a few drops of older or younger parts of the cytoplasma, etc. Experiments prove that the formation of the cap is not immediately dependent on the nucleus, as is the case with morphogeny, differentiation , and development. Differentiation takes place in a spatially and temporally precisely regulated synthesis of proteins. The regulation of protein synthesis /translation/ and hence the expression of genes is also not immediately dependent on the nucleus. On the other hand the forming and output of substances which form the cap, as well as morphogenic substances are directly dependent on the nucleus, as well as the transmission of specific information. The substances which form the cap, morphogenic substances and specie-specific information are identical with m-RNA. The synthesis of m-RNA /transcription/ and hence also gene activity are directly dependent on the nucleus.

9.8

343. BEISENHERZ, W.: Die Bedeutung des Experimentes im Biologieunterricht der gymnasialen Oberstufe in der Sekundarstufe II. /The significance of experiments in teaching biology in the upper grades of a general education secondary school./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 7, pp.216-219.
2 tabs.

The students newly accepted in 1978/1979 to the University at Bielefeld and to the Teacher Training College in the same town were asked about the instruction they had received while at secondary school. A total of 127 students studying various biological disciplines from 86 different secondary schools were asked to fill in a questionnaire concerning biology teaching, methods of teaching used, and the subject-matter taught. The findings are very interesting. They indicate that instruction in the upper grades of secondary school was mostly of a verbal nature. Experiments in the biology course took place in schools attended only by one half of the respondents. It was also found that when the course included causal and analytical problems, they were dealt with mainly in a theoretical manner. Also the number of lessons devoted to biology greatly differed from school to school(a basic course- 2-3 weekly lessons; a biology course- 4-8 lessons per week/. In some schools a shortage of biology teachers was the cause of the small number of weekly lessons.

9.8

344. BU[illegible]KART, K.H.: Versuche mit Amylase aus Gerste im Unterricht und in der Schülerübung. /Experiments with barley amylasis in teaching and in pupils' assignments./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 9, pp.274-278.
1 fig.

When beer is brewed, the fermentation of amylasis is very important - it causes the transformation of starch into soluble sugar. The author describes the processing of malt, the swelling of barley, its germination and dehydration. Also beer brewing techniques are explained as the biological foundation for understanding amylasis output and the brewing of beer. In the second part of the article the experimental determination of amylasis is described in a form adapted for use as experimental assignments for pupils.

9.8

345. BRETT, W.J.: Determination of Human Temperature Rhythms.

The American Biology Teacher, 41, 1979, No.5, pp.305-306, 308.

The article describes a laboratory excercise in which biological rhythms in man can be demonstrated. The excercise is suitable especially for students in the upper classes of secondary school. They should first be acquainted with general aspects of biological rhythms and some examples /a sun day, a lunar day, month, year, etc./. This theoretical introduction should also include an explanation of the temperature of the human body. In the practical part, the students are asked various questions based on assignments - for instance to measure the temperature of their own bodies in the course of 24 hour period, etc. The author describes in detail how to proceed in the excercise, how to obtain various data and how to calculate average data. Temperature measurements are carried out orally.

9.8

346. BUKATSCH, F.: Eine einfache Anordnung zur Demonstrationen des Aktionsspektrum grün in lebenden Laubblätern. /Simple instructions for demonstrating the action spectrum of living leaves./

Praxis der Natruwissenschaften-Biologie, 29, 1980, No. 11, pp.349-350.
1 fig.

Nasturtium /Tropalolum mojus/ is an annual plant cultivated for its large yellow or red flowers, as a decorative garden plant. Its leaves can be used for well known experiments with photosynthesis. The plant should first be cultivated in a flower pot. Before we begin the experiment proper the plant should be kept in the dark for 12 hours /or overnight/ and then placed in the sun. The leaves exposed to sunlight are then torn off the plant, cooked in alcohol and transfered to a Lugol solution. The parts of leaf exposed to light turn black /grains of starch/. If we shade part of the leaf it remains without changes in colour even after it is placed in the Lugon solution. The experiment can also be varied: the Nastrium leaf can be covered with a young small ivy leaf /which is still translucent/ before exposure to sunlight. After the leaf has been cooked in alcohol and transfered to a Lugol solution the outline of the ivy leaf will appear on the nastrium leaf. If we cover the Nastrium leaf with an exposed negative film, after cooking the leaf in alcohol and placing it in a Lugol solution the positive image of the negative will appear on the leaf. If we use a tin foil rectangle for the experiment into which four holes of the same size have been cut and pieces of coloured /red, yellow, green and blue/ cellophane attached with a piece of Scotch tape, then we can demonstrate the significance of various colours in the spectrum for photosynthesis. The area covered with green cellophane will be without changes in colour, because underneath this colour no starch develops, while all other colours will cause colour changes - the most starch grains will be formed under the red filter, the least under the yellow filter.

9.8

347. CASE, B.L.: Bacterial Growth Measurement by Gas Production.

The School Science Review, 62, 1980, No.218, pp.79-80.
2 figs.

A study of factors which influence the reproduction of bacteria and learning about the various stages of their multiplication is part of the basic microbiology syllabus. In place of preparations for complicated experiments, whose outcome is not always satisfactory, the author offers a method which requires a minimum of material and time: ESCHERICHIA COLI can be cultivated in a simple apparatus made up of test tubes and pipettes with a cultivation medium. As the bacteria multiply, the fermentation of carbohydrate gases takes place. Their increase can be read on the pipette /see diagram attached to article/.

9.8

348. CIZALDO, G.R. - BOWN, G.W.: Animal Respiratory Control Mechanisms: A Quantitative Demonstration.

The American Biology Teacher, 42, 1980, No.4, pp.206-210.
3 figs.

Manuals of laboratory physiology usually cite experiments on respiration control which are too descriptive and not sufficiently objective. The authors deal in detail with their own experiment for which they designed a simple but effective apparatus called a plethysmograph. The experimental animal is placed in a glass tank, to which the plethysmograph is connected; its triple connection with the tank registers changes in pressure caused by the animal's respiration. As soon as air is inhaled it is warmed to the temperature of the body and dampened to saturation. This causes changes in the pressure in the tank which are measured with a sensitive pressure gauge.

9.8
349. DAWSON, J.: Salt.

National Science in Schools, 18, 1980, No.1, pp.14-16.

It is surprising how little has been written about salt, in spite of the fact that it has been proven that man has been using salt since the stone age. The author first acquaints students with the chemical composition of salt and describes several experiments. She also describes the history of the salt trade in Europe and in the Middle East and explains why salt is so important for man, to what uses it can be put and how much salt is consumed on a world scale. Finally she quotes various maxims concerning salt, which mostly originated in the Middle Ages.

9.8
350. DIETERLE, A. - BONORA, V.: Lernleistungen des Menschen.
/The ability to learn in man./

Praxis der Naturwissenschaften, 29, 1980, No.5, pp. 129-139.
3 figs., 2 tabs., 2 worksheets.

The ability to learn is genetically determined, because it has been developed in the course of evolution. Among all the animals man has achieved the greatest ability to learn and to adapt to various situations. He is, however, able to learn only when he at the same time receives instructions on how to learn and has the opportunity to excercise and develop learning techniques, while at the same time improving and utilizing the capacity of his memory. Learning is connected with a change in behaviour, which usually takes place either by forming a connection with a conditioned reflex, by the use of trail and error or on the basis of an understanding of the essence of the phenomenon being learnt. These techniques can also serve as the subject of experiments in class, where the outcome of learning is verified and analysed. In all the experiments the pupils served as experimental persons. The findings of the experiments explain what happens when knowledge is accumulated by learning. The described experiments were carried out in the 12th class of a general education secondary school in Miltenberg and verified the existence of conditioned reflexes /lowering the eyelids when the eyelashes register a current of air, the pupillary reflex, the trial and error method when using a labyrinth with the experimental person blindfolded and learning to understand an associative text/. The worksheets attached to the article contain three types of labyrinths. The experiments are assessed graphically.

9.8

351. DOWNIE, J.R.: Culturing Chick Embryos - A Simplification of New´s Method.

Journal of Biological Education, 13, 1979, No.2, pp. 114-118.
1 fig.

The author describes a simplified version of New´s method for cultivating chicken embryos. The basic method uses fertilized chicken eggs which are re-incubated for a period of 20 - 24 hours. The method of preparing the whole culture is described in detail. It makes it possible to observe continually the critical first three days of development of the embryo. The conditions needed for organizing the experiment are not difficult, so that the whole method is suitable for use in school. The article also cites six alternatives of the basic method and the relevant evaluation.

9.8

352. FEEST, J.: Die Wirksamkeit von Verdauungstabletten - Schulversuch als Text ? /The effect of tablets on digestion. A school experiment or text ?/

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.5, pp.152-154.

In school during biology teaching the effect of tablets for improving digestion by the stomach and intestines can be demonstrated in vitro. The author recommends carrying out the experiments with three types of these tablets /Enzynorm, Pankreon and Enzymed/. They are all soluble in water, but they either have an effect in an acidic environment /in the stomach/ or in an alkaline environment /in the intestines/. In the intestines the tablets for instance support the disintegration of fats and they are not soluble in the acidic environment of the stomach. On the other hand Enzynorm contains stomach enzymes, is soluble in water and in acids /in the stomach/, but also in the alkaline environment of the intestines. Enzynorm disintegrates lean beef. On the other hand Pankreon forte, which contains fermenting agents produced by the pancreas, is soluble in a 1% alkaline solution /NaOH/, in water but not in diluted hydrochloric acid. It helps to digest fats. Enzymed is a double enzymatic drug in which proteins and fats are soluble. The findings of the experiments are discussed and summed up.

9.8

353. GILL, J.: A Simplified Experimental Scheme for the Study of Mitosis.

Journal of Biological Education, 14, 1980, No. 3, pp.219-222.
2 figs.

The behaviour of chromosomes during reduction division is an important part of the examinations taken by 15 year olds. The author describes the method of preparing specimens for which only a simple and inexpensive apparatus is needed and which have been successfully tested in class work. The method uses 8-hydrosyquindine in place of the usual colchicine and toluidine blue is used for staining the chromosomes. The method is quicker and what is most important, inexpensive; with the aid of the apparatus shown by the author it can be used in any school.

9.8
354. GINNS, I.S.: Studying the Solar Spectrum.

The Australian Science Teachers Journal, 24, 1978,
No.2, pp.115-118.
2 tabs.

The author describes several experiments done with students from the 11th and 12th forms of secondary schools, which allow the application of practical aspects which touch on astronomy, chemistry and physics,as well as the utilization of spectroscopy and analytical methods. The key procedure is an investigation of the solar spectrum with the aid of a simple laboratory spectroscope. During all the experiments it is possible to demonstrate some general principles, such as the relation between the emission and absorption of radiation, etc. The experiment itself is divided into two parts - studying emission and the observation of solar radiation. In the first stage the students record data on gaseous components /hydrogen, helium, mercury and sodium/. They then follow the relation between the emission and absorption of hydrogen, sodium and magnesium. After completing the experiments, the students answer some theoretical questions with the use of their previous experiences /for instance what is the cause of solar absorption radiation, what type of spectrum does the solar chromosphere have, whether the spectrums of other plants are similar to the solar spectrum, what is the Doppler effect, etc./.

9.8

355. GRIBENSKI, A.: La démarche expérimentale dans les sujects d'examens. /An assessment of experiments in examinations./

Biologie-Géologie, 67, 1980, No.2, pp.431-436.

Prof. Gribinski /from the University of Rouan/, here reiterates the conclusions of a conference held in Chamonix concerning science teaching and provides 6 examples of examination assignments which differ in content, but especially in form, from what is usually done during examinations. This method places greater demands upon the pupils, but leads to logical thinking which differs greatly from repeating what has been learnt only by rote. The findings of these experimental examinations are summed up in tables which are very interesting.

9.8

356. HADLEY, E. - YONGGREN, N.A.: Demonstrating Hormonal Control of Vertebrate Adaptive Color in Vitro.

The American Biology Teacher, 42, 1980, No.1, pp. 12-15.
4 figs.

The majority of animals have colours which make it possible for them to be indistinguishable from their background. Other animals, however, have in their skins special cells /chromatophores/ which have several variations of chemically different pigments in relation to a specific environment. A highly demanding laboratory experiment with specimens from a frog shows the movement of such pigments in various colour environments.

9.8

357. HEALEY, J.A.D.: Distillation as a Practical Problem.

The School Science Review, 61, 1980, No.216, pp. 464-475.
6 figs.

Only theoretical explanations of the problem of distillation or experiments carried out with unsuitable liquids /for instance crude oil/ have caused students to have a rather vague idea of the problem. The author in a previous article discussed various negative aspects of the curriculum and the misunderstandings which follow from this: here he provides instructions on practical and easily understood experiments with diagrams of the apparatus needed.

9.8

358. HERMANN, M.C. - JOHN, B. - HERRMANN, F.H.: Genetische Experimente /XII./ /Genetical Experiments /XII/./

Biologie in der Schule, 29, 1980, No.1, pp.44-46.
3 figs.

The experiments described here aim at a study of meiosis in organisms with sexual chromosomes, on the basis of the example of the maturity of pollen of Silena dioica, which belongs to the XY type. Male plants have the same number of autosomes and 2X chromosomes. Sexual chromosomes can be observed in the mitotic metaphase. For the observation of the meiosis stage, the buds of male flowers are used, which are fixated in a mixture of ethanol and acetate acid /at a ratio of 3:1/. After fixation for 24 hours the anthers can be mounted and stained with carmine. Spreading specimens are then observed.

9.8

359. HESS, U.: Eine vereinfachte Darstellingsmethode für Nukleinsäuren und ihre Bausteine. /A simplified method for demonstrating nucleic acids and their basic structural components./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.4, pp.240-243.
2 figs.

Until now general education secondary schools have been making nucleic acids for use in biology teaching out of veal thymus, which has to be very fresh so that the cells of the thymus are still alive. It is therefore difficult to obtain and the work itself it extended and rather difficult for pupils to do. For this reason the author concentrated on finding some other material which might serve for demonstrations of nucleic acids which form the foundation of the hereditery material of organisms. In school, nucleic acids can also be produced from the liver, brains, spinal cord, testicles, as well as from the buds of plants, the tips of roots, from bacteria, yeast and sperms. The best and most readily workable material, however, are the germinating seeds of beans, the scarlet runner bean and soybeans. From the germinating seeds of these plants white tissue, composed of the epicotyl and hypocotyl, are cut out or the root tips are used. The author describes in detail the production of nucleic acids and the experiments which can be undrtaken with them, such as the hydrolysis of nucleic acids, their alkaline hydrolysis, the chromatography method of thin layers, chemical methods, etc. Also a detailed list of the material needed for demonstrations and for experiments is provided.

9.8
360. HIRSCHFELD, D.: Schulversuche an Mäusen für die Sekundarstufe II.: Kurs Ethologie. /School experiments with mice for the upper grades of secondar school: an ethology course./

Praxis der Naturwissenschaften, 29, 1980, No.5, pp. 157-159.
4 figs.

The article continues in one on similar subjects written by the author and published in the same journal in vol. 26, 1977, No.5, where he described a number of experiments with white mice, within the framework of the ethology course. In this article the author describes the construction of a learning box, which makes it possible to train mice to react to various symbols. The cost of building the box is minimal, and the pupils will be able to make the box for the white mice themselves. The apparatus provides the mice with very small portions of food, so that they are constantly willing to eat more. During the experiments the mice make positive and negative choices of food, which are counted. The author describes in detail the building of the box, which is also shown on photographs, and three diagrams are provided.

9.8
361. JUNGBAUER, W.: Experimente mit Schülergruppen im Psychologie-Unterricht. /Experiments with groups of pupils in teaching psychology./

Praxis der Naturwissenschaften, 29, 1980, No.5, pp. 146-157.
7 figs., 9 tabs.

The author describes several experiments concerning human psychology which can be carried out directly in class. They can be used in the upper classes of secondary school, in hobby clubs which are interested in psychology or ethology. The experiments concern the forming of groups of pupils within a class during the teaching of various subjects. Also the mechanism of forming links between individuals and a group and how they are formed are studied. The described experiments study the adaptation of individuals to the standards of the group and the changes which occured within the group as a consequence of the acceptance of new members and /or a person with leadership qualities. The teaching of psychology helps students to solve some of the psychological problems which they encounter and also a confrontation with the basic psychological literature. It contributes to attempts at self-identification through psychology and the use of this science in judging others. The experiments include Sherif's autokinetic phenomenon, the estimation of distance between two points and the suggestibility of the group, the advantages of a group in carrying out assignments involving the seeking out of something and the correlation between two alternative signs.

9.8
362. O-HOBBS-GAALEN: Childrens' Beliefs about Inherited Characteristics.

Journal of Biological Education, 14, 1980, No.2, pp. 137-146.

A group of 32 children aged 7 to 13 years were administered a set of questions concerning their beliefs on inherited characteristics. An analysis of the answers indicates that from the age of 7 years, children already have a definite opinion concerning inherited characteristics and only one child in the group did not have any beliefs on the subject. The author provides various considerations on the subject, together with instructions on how to organise the interviews with the children and how to analyse the responses. Tables sum up the outcome of the experiment which reflects how the children react to these questions.

9.8

363. KAZAKOV, Y.A. - KAZAKOVA, S.M.: *K provedieniyu opita po obnaruzheniyu deystviya katalazi.* /On carrying out an experiment to determine the effect of catalase./ Biologiya v shkole, 54, 1980, No.5, p.34.

The authors describe four different, rather complicated experiments:

1. 2 same leaves of waterweed or eelgrass are placed on a slide, one of which was first boiled. Add a few drops of 3% H_2O_2.
2. Use same procedure for two slices of potato tubers.
3. Put 5 ml of a fresh 3% solution of H_2O_2 in two test tubes. To one test tube add a drop of blood and into the second a drop of heated blood.
4. The authors show a picture of a simple apparatus for determining the activity of catalase in various plants, in various organs of the same plant, etc. This activity is especially large for instance in germinating seeds of oil-bearing plants, in young leaves on branches and is low in the roots.

9.8

364. KING, E.L. - KNIGHT, A.B.: Perception of Work Load and Automatic Responses: A Model for Student Experimentation.

The American Biology Teacher, 42, 1980, No.2, pp. 94-98.
8 figs.

Laboratory excercises in biology tend to be more effective if they are combined with traditional laboratory experiments. One alternative is to combine parameters which are usually assessed independently. The experiment described examines the relation between conscious motor activity and such autonomous processes as breathing, maintaining blood pressure and heart beat. A special experiment is devoted to the role of consciousness in controlling cardiovascular and respiratory processes; this control is usually considered to be a function of the autonomous nervous system.

9.8

365. KINSEY, T.B.: Mice in the Birdseed: Investigating Malthus´ Principle.

Malthus´ well known law, according to which population tends to grow geometrically while the supply of food only arithmetically, is practically tested by the author of the article as a school experiment. For this purpose he uses a glass aquarium where together with mice he puts measured portions of birdseed; students recorded the quantity of food the increasing mice population consumes. The findings served for a study of various other relations.

9.8
366. KLEE, R. - ERBER, D.: Variationen des Potometrversuch.
/Variations of experiments with a potometer./

Der mathematische und naturwissenschaftlichen Unterricht,
33, 1980, No.5, pp.304-309.
4 figs.

In order to demonstrate a transpiration flow in a plant, usually a potometer is used /Kosarov, 1897/. This apparatus can be set up in various alternatives which the authors describe, as well as the course of the experiments for which it is used. Experiments with a potometer demonstrate that the transpiration flow takes place in the wood fibre bundles formed by dead cells. In the experiment described, water with salt is used which through transpiration flows arrives in the leaves which are thus damaged and the intake of water declines. A retort with water and a branch with leaves is needed - lilacs serve very well. The branch should to fixed into the retort by an air-tight stopper /to form a so-called suction bottle/. A water supply is attached to a side openning in the retort with a calibrated pipette /with 0.01 cm lines/. The experiment should be carried out in the 6th class, in groups of 3 to 5 pupils. The reading of the pipette calibration should be recorded every 2 minutes. First destilled water is used and after 10 minutes this is replaced by 30% salt solution. The experiment is also influenced by temperature. The speed with which the water is used up by the plant is in direct proportion with temperature.

9.8

367. KLEIN, R.M.: Simple Separation of Plant Pigments.
The American Biology Teacher, 41,1979, No.4, pp. 240-241.

The article describes the method used for isolating plant pigments where the initial material are the leaves of available indoor plants. In this article the author concentrates on the extraction of autocyanogen from vacuoles. The extraction is carried out by boiling in water and the pigment thus obtained is usually brown. Other methods of extracting chlorophyll and/or carotene are based on the centrifugation of 70% izopropylalcohol. In the upper grades also paper chromatography can be used to isolate chlorophyll. The best results are obtained with fruit juices in a bottle with a wide bottleneck. Tetrachlore can be used as a solvent. The whole method, as well as outcome, are described in detail.

9.8

368. KLOB, W.: Nachweis ddr der Kohlendioxid-Verbrauchs während der Photosynthese. /Proof of the consumption of carbon dioxide during the process of photosynthesis./
Praxis der Naturwissenschaften-Biologie, 29, 1980, No.11, pp.313-316.
1 transparency.

The author describes a very high quality experiment to optically prove the consumption of carbon dioxide in the process of photosynthesis of terrestial plants. The experiment requires 1 teaching lesson. It is suitable for a basic biology course or for an extended biology course in the upper classes of general education secondary school. It is founded on the observation of changes in colour of special red pigments when carbon dioxide is being consumed in an enclosed reaction area. This experiment is particularly appropriate because for a demonstration of photosynthesis usually only proof of oxygen production is given by counting the bubbles of oxygen which come to the surface when photosynthesis of waterweeds is taking place. The use of litmus testing is not suitable for this experiment.

9.8

369. KLOB, W.: Unterscheidung von C_3- und C_4 Pflanzen im Schulexperiment. /Distinguishing C_3 and C_4 plants in school experiments./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.11, p.310,313.
1 fig., 4 tabs.

The author develops an experimental method for distinguishing C_3 and C_4 plants in school. The different ways in which carbon dioxided is bonded in both physiological types of plants can be experimentally verified on the seedlings of the kidney bean and maize: the kidney bean belongs to the C_3 type and the maize to the C_4 type. Different bonding in the experiment is used for optically proving different fixation mechanisms of carbon dioxide. Suitable indicators are used, based on colour differences. The experiment is intended for the upper classes of general education secondary schools and requires a two hour period. C_3 plants bond carbon dioxide through ribulosis diphosphate into a primary product /photoglycerolic acid/, while C_4 binds carbon dioxide in such a way that the immediate product is dicarboxylic acid. A universal Merck pH 4 - 10 indicator is used with colour indicators.

9.8
370. KOLESNIKOV, V.I. - POLOSIN, V.S. - NIFANTYEV, E.Y.: Provedeniye opita po polucheniyu aminokislot bez vozdeystviya fermentov. /Experiments to produce aminoacids without enzyme activity./

Biologiya v shkole, 54, 1980, No.5, pp.35-36.

In a test tube mix 1 ml acetaldehyde with 1 - 2 drops 10% ammonia and a pinch of calciumoxide. This mixture is put into 10 capillaries which are then sealed in and placed in a vessel with boiling water where they are bioled for 2 - 5 hours /this can be done with interruptions/. Proof of the presence of aminoacids in the capillaries is carried out with ninhydrine.

9.8
371. KOZAKIEWICZ, A. and M.: Badanie budzetu energetycznego organizmu. /Studying the energy balance of an organism./

Biologia w szkole, 33, 1980, No.3, pp.172-173.
1 tab.

The authors discuss the energy balance of an organism. Every organism must acquire from the environment energy for its existence. This aquisition differs in autotrophic and heterotrophic organisms. Organic compounds acquired from the environment as food by heterotrophic organisms are at the same time the only source of all substances needed to sustain life. The article also describes in detail the difference between the energy balance of autotrophic and heterotrophic organisms. Heterotrophic organisms utilize part of the food they acquire, while the remnants remain in the environment and also energy and substances are returned in the form of feces and urine into the environment. The problem of food and energy in the environment depend on the size of the organism /larger organisms have a larger consumption of food/, upon the ecological situation, the supply of food in the given area, the temperature, population density, etc. The speed of metabolism is influenced by the temperature. Various energy requirements in animals with variable temperatures of blood and in animals with constant blood temperatures are explained. The authors recommend dealing with the whole complex of these problems in experiments with slugs /of the family Arionidae/ of various sizes. The experiment requires lettuce as food for the slugs, analytical scales, cotton wool and Petri dishes. The experiment with feeding the slugs requires 10 days: every day the slugs recieve the same weighed quantity of lettuce leaves. Also the feces of the slugs must be assessed and summed up in diagrams. It is necessary to determine the loss or gain of weight of each slug, the quantity of food consumed and reduced to grams of dry matter. Lettuce contains 92,4% water, the bodies of the slugs an average of 85,6%. For the calculation of kilocalories the following data is needed:1 g dry lettuce = 4.48 Kcal; slugs = average 5.01 Kcal., feces an average of 4.25 Kcal. Increments /in the bodies of the slugs/ are determined, the weight of waste /the weight of the feces/ and the quantity of food consumed by each slug during the course of the experiment.

9.8
372. KÖNIG, H.: Das wirkungsspektrum der Photosynthese als Schülerversuch. /An effective photo-synthesis spectrum as a school experiment./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.4, pp.113-117.
2 figs.

The effectiveness of photosynthesis can be demonstrated in school on the basis of an experiment in which the method is used of counting bubbles of oxygen which develop in the course of photosynthesis of a suitable acquatic plant, such as a waterweed or Callitriche autumnalis. It can be done in the upper classes of secondary school. The following is needed: a stand, an aquarium, thermometer, a test tube with sodium hydrogen carbonate /$NaH.CO_3$/, a plexiglass filter, a source of light /a slide projector serves best for this purpose/ and colour filters /red, blue, green/. The source of light should have 10 000 luxes. The author cites the distance from the source of light at which the experiment should be done: if the red filter = A, then for the green filter A:1.3 and for the blue filter A:2.4. The pupils count the number of escaping bubbles of oxygen per unit of time. The experiment is analysed and assessed.

9.8

373. KRIDKE, D.F - YELVERTON, H. - KRIPKE, Z.D.: "Biorythms" is bio-nonsense.

The American Biology Teacher, 41, 1979, No.2, pp. 108-109,128.
1 fig., 2 tabs.

The article deals with the problem of "biorythms". These are regularly repeated cycles of physical, emotional and intellectual states, which begin with the moment of birth of a person. The authors consider these "biorythms" to be so much nonsense; they attempt to test their reliability. Their project included 30 people, who did not know the prediction of their "biorythms" and were asked to record their physical situation. At the same time their mental states were determined. Another set of experimental persons included 50 people who visited a physician with an acute illness or because of an accident. On the basis of the dates of their birth curves of their biorythms were drawn up and whether their sickness or accident occured on a "critical day" was studied. The outcome was assessed statistically.

9.8

374. LENNOX, Y.E.: Agrobacterium and tumor induction: a model system.

The American Biology Teacher, 42, 1980, No.3, pp. 160-165, 174.
8 figs.

Tumors on trees are considered to be caused by cancer and they often achieve large size. They are, however, a disease caused by the bacterium Agrobacterium tumefaciens. The author describes in detail this disease and the bacteria which cause it on the basis of an experiment where the cause of the disease is demonstrated, data recorded and presented in the form of diagram. The author also provides unique micro-photographs. The experiment is organised in such a way that it can be done in the laboratory.

9.8

375. LIFFEN, C.L. - HUNTER, M.: Aggregations in flatworms.
Journal of Biological Education, 14, 1980, No.3, pp. 200-204.
1 fig.

The authors describe a school experiment with black flatworms /Polycelis nigra/, where the purpose is to determine the factors which cause flatworms to seek shelter and what influences the speed with which they do so. The experimental flatworms were exposed to the effect of light, heat, oxygen and various chemicals. For this purpose small containers were used in which the experiments were done - the flatworms sought shelter in them when exposed to the above named factors. The commentary also provides timetables. This experiment does not require costly material or extensive preparations and is suitable for secondary schools of all types.

9.8
376. LINDENHAHM, M.- SCHMIDT, V.: Genetische Experimente /XIII/. /Genetic experiments /XIII./ ./

Biologie in der Schule, 29, 1980, No.4, pp.168-171.
4 figs.

In many species of higher plants, especially of the genus Rhoeo and Oenothera, series of translocations lead to the forming of large chromosome rings in the course of meiosis, which can easily be observed. In the course or reciprocal translocation, chromosomal segments and genes are exchanged between two non-homological chromosomes. If the diploid organism is homozygotic then the outcome of translocation are newly bonded groups. In heterozygotic plants a characteristic pattern in the shape of a cross is formed from 4 chromosomes. If at the correct sections of homologous choromosomes crossing-over takes place, then after the termination of chiasma a ring with 4 chromosomes will be formed. The distribution of individual chromosomes of this ring in anaphase I differs. In series of reciprocal translocations a larger number of rings will develop on the chromosome. The authors provide instructions for using various material and for observations with Rhoeo discolor.

9.8.
377. LONERGAN, T.J.: Demonstrating the Regulation of Plant Growth and Development.

The American Biology Teacher, 42, 1980, No.9, pp.525-527.
4 figs.

The growth and development of plants is partially regulated by the environment. Plants adapt to their surroundings and are able to change their growth or development, depending on this environment. The same is, to a certain extent, also true for animals, but plants require only several hours, days or weeks for such changes. The author describes an experiment with 25 seeds which he cultivated under various temperatures and lighting conditions until maturity. On the basis of specific examples and photographs he also discusses growth process, phototropism and geotropism.

9.8
378. MEEK, E.J. - BUCHMAN, J.R.: Studies on Urease: A Possible Project.

The School Science Review, 61, 1980, No.216, pp. 496-503.
6 figs.

Urease is an enzyme which always crystalizes and acts as a catalyst in the hydratation of urea into ammonium carbonate. The ease with which it is possible to obtain urease and its relative stability have led to its frequent use in school laboratories. The authors offer a new and relatively simple method of determining urease activity with a constant pH factor. This method, which is extensively described in the article, was tested for determining optimum pH levels and optimum temperatures for urease activity and for determining the effect of changes in urease concentration, as well as that of urea and inorganic ions. The article contains very clear diagrams.

9.8

379. **MOTTLEY, J.:** Sucrose Density - Gradient Centrifugation.

The School Science Review, 61, 1980, No.217, pp.693-695.
1 fig.

The article describes a practical demonstration of centrifugation during a school biology course - a problem which is often overlooked because of the technical difficulties attached to it. It is at the same time an excellent means of demonstrating how the biologist can rapidly separate individual components of cells. The author describes an experiment with sucrose, which can easily be done in a school laboratory with simple centrifugation and further steps, which are described in detail.

9.8

380. **OWENS, N.W.:** Projects on the Ecology of Freshwater Mussels /Unionidae/.

The School Science Review, 61, 1980, No.216, pp. 493-496.
2 figs.

Freshwater mussels are suitable for school biology practical excercises, which provide opportunities for various ecological studies. Freshwater mussels can be found in large numbers in the mud of slowly flowing waterways, lakes and ponds and are thus easily accessible for most schools. The author describes their breeding in school laboratory conditions, the opportunity they provide for studying the parasites they have and other interesting ecological problems.

9.8
381. PAINE, C.: The Game of Temperature Control.

The American Biology Teacher, 42, 1980, No.5, pp.286-289, 297.
2 figs.

All higher animals regulate their body temperature. The body temperature of thermophilous animals depends on their relation to the environment. The author has made up a sort of biological game in which students learn to understand the mechanism of body temperature regulation under various conditions and in various animals. The game is made up as a laboratory excercise and is suited for the upper grades of school.

9.8
382. PFEIL, H.: Die Bedeutung der Fette für den Organismus. /The significance of fats for the organism./

Naturwissenschaften im Unterricht, 28, 1980, No.8, p. 155.

The article discusses the importance of fats for the human organism. It also describes an experiment in which fats are emulgated by bile liquids. In the temperate zones approximately 30% of all the calories needed by man are provided by fats in food, while in colder areas this percentage is higher and also children need more fats in their food than adults.

Fats have a high calory content, its physical value is 9.3 kcal/g/ = 38.9 kJ/g. The oxidation of fats in the organism produces heat. The bodies of men contain approximately 10% fat and those of women 25%. The body contains various fatty spots which disappear in periods of hunger. Fats are poor conductors of heat, they isolate nerves, protect the body against heat loss; vitamins A, D and E are soluble in fats. The body is able to properly assimilate proteins only if sufficient quantities of fat are present. Food which is insufficient in fats leads to a loss of physiological, mental and physical powers. The human organism is capable of utilizing all fats which melt at temperatures less than 27°C. Bile is not an enzyme and does not have digestive properties. Fats are broken down by lipase produced by the pancreas. Fats are broken down into glycerol and fatty acids; the citric acid cycle of the body also is connected with the breaking down of fats. The damaging effect of cholesterol on the blood vessels has not been proven. It is, however, clear that too large quantities of fats in the body place a great load upon blood circulation. The boiling, baking or drying of foods is impossible witkout fats.

9.8

383. POENICKE, H.W.: Die Vergrösserung innerer Oberflächen fördert die Stoffaufnahme. /An increase in internal surface areas incerases the intake of substances./

Naturwissenschaften in Unterricht-Biologie, 28, 1980, No.1, pp.15-17.
2 figs.

The author deals with a problem which is very important from the point of view of digestion physiology. He recommends a group project undertaken by pupils, which aims at proving that an increase in the surface area of an internal organ increases, among others, the intake of substances by that organ. For the experiment he uses two match boxes. One is partitioned by a straight piece of filtration paper, the other by a piece of filtration paper with concertina folds. Into one part of the partitioned matchbox he puts a colourless solution of agar, into the other half agar coloured with indigo carmine. The folded paper has an area twice as large as the straight paper dividing the matchboxes. The colouring agent is diffunded from the coloured into the colourless part of the agar for 20 minutes. After this period the degree of colouration of both formerly colourless parts of the agar can be compared.

9.8
384. ROBERTS, A.V. - SHORT, K.C.: An Experimental Study of Mitosis.

Journal of Biological Education, 13, 1979, No.3, pp. 195-198.
1 tab., 3 figs., 1 appendix.

A comparison of leek root tips immersed in colchicine and normal root tips can provide data concerning the role of mitosis in growth and demonstrates and clearly proves the importance of colchicine in the analysis of karyotypes. The article cites Feulgen's technique, on the basis of which we can obtain high quality specimens of chromosomes in a routine manner. The cytology excercise described does not require any sophisticated apparatus; it can be done in a class with science majors. The author provides instructions for the germination of the roots of leeks and beans, the preparation of a 1% solution of colchicine and its application. The staining of the specimen is done by a modified Feulgen method. During a two-hour period the students can make several permanent specimens, which are then assessed in the next period.

9.8
385. ROMANOV et al.: In Vitro Contraction of Muscle Fibres and Muscle Proteins.

The School Science Review, 61, 1980, No.217, pp. 690-693.
3 figs.

Muscle fibres can be obtained from animal organs and mounted on a slide; in a concentrated glycerol environment they can be observed when they continue to function /contract/. The authors describe an experiment, which in their opinion has many didactical advantages, because it demonstrates the contraction of a whole muscle and the contraction of proteins isolated from the fibres. The experiment also demonstrates the function of the muscle, even if it is not connected to the organism.

9.8

386. SCHARF, K.H. - GEHRING, M.: Die Schreckenreaktion bei kaulquappen der Erdkröte /Bufo bufo L./. Versuche zum Ethologieunterricht in der Sekundarstufe II.
/The fright reaction of tadpoles of the Common toad /Bufo bufo L./. Experiments in ethology teaching in the upper classes of secondary school./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.1, pp.20-25.
5 figs.

The author describes experiments with the tadpole of the Common toad, which concern fright reactions found in wounded tadpoles. Especially the skin on the tail and back of the tadpole are rich in specific fright substances, while the belly has less of them. Wounded tadpoles are then placed in a clean water bath for two minutes in order to flood out the fright substances. In this way 100 ml of solution with the fright substance are acquired. 10 ml are put in a pipette or injection syringe and injected into a cucumber slice, which is then offered to the tadpoles for eating; the number of tadpoles which swim towards the cumcumber are counted during a specific period of time. A blind experiment is carried out with plain water and cucumber slices without any additive. Similar observations can be made of the tadpoles' reaction to adding the fright substance to the water in which they are swimming. The author also cites experiments to observe the reaction of tadpoles towards adding fright substances from dead tadpoles. In experiments with the tadpoles of the Edible frog /Rana esculenta/ it was found that they do not have a fright reaction. They do not react to the skin products produced by fright of the member of their own specie. The fright reaction of frogs is specific and can be shown to exist also in the Calamity toad /Bufo calamita/.

9.8
387. SCHARF, K.H. - OTT, P.O.: Versuche: Bierbrauen im Schulversuch. /Experiments: The brewing of beer in a school experiment./

Praxis der Natruwissenschaften-Biologie, 29, 1980, No. 9, pp.270-274.
1 fig., 1 tab.

Experiments with alcohol fermentation or perhaps the fermentation of beer have their place in school biology. They can be done either in mandatory courses or in elective courses. For these experiments ground malt, yeast, hops and water are needed. The authors describe the course of such an experiment within the framework of the topic on alcohol fermentation. In the experiment it is possible to make comparisons between two important biological phenomena: fermentation and respiration. The authors also discuss the history and present state of beer brewing. The beer matures in 6 weeks.

9.8
388. SHEPHERD, A.J.: The Digestion of Starch - Using a Disposable Syringe.

The School Science Review, 61, 1980, No.217, pp.697-698.

The existing method of doing this experiment in class /the breaking down of starch/, which is often done in laboratory periods, usually mixes enzymes and starch in a vessel. It is not, however clear enough, especially concerning the role of turbidity and frothiness. The author describes the method of using an injection syringe, so that turbidity and froth are overcome and the students are able to observe the whole process.

9.8

389. SCHMIEGER, H.: Bestimmung der Minimalen Hemmkonzentration /MHK/ von Streptomycin und Selektion resistenter Bakteriemutanten mit der Gradientenplatte. /The determination of minimum breaking concentrations of Streptomycine and selection-resistent mutants of bacteria with a gradient plate./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.9, pp.278-280.

The author describes an experiment which makes it possible to determine in a simple manner important facts which are highly significant for the use of individual antibiotics, especially the so-called minimum breaking concentration. At the same time it is possible to repeat the experiment and to demonstrate so-called additive polygeny, when the common effect of a large number of genes leads to the higher resistance of bacteria. The aim of the experiment is to determine minimum breaking concentrations of Streptomycine for the bacterium Escherichia coli. The author describes the preparation of the bacteria culture, the course of the experiment and its assessment.

9.8

390. SCHUBERT, F.: Ein Modellversuch zum Begriff der Oberflächenvergrösserung. /A model experiment concerning the notion of an enlarged surface area./

Biologie in der Schule, 29, 1980, No.6, pp.250-251.
1 fig.

One of the most conspicuous phenomena in organisms is the size of their surface. Pupils have difficulty in understanding this problem. The author discusses it in connection with the digestive process in the oral cavity, with intestinal villi, red blood cells, with alveoli, the brain and the mitochondrial membrane. He cites an alternative definition of the phenomenon for use in the 8th class and suggests carrying out a model experiment, where into one vessel with cold water a test tube with 5 cm^3 of warm water is inserted, while in a second vessel 4 different test tubes with 1 cm^3 of water of the same temperature are inserted. In 2-3 minutes the temperature in both vessels is measured. The temperature in the vessel with the four test tubes of warm water has a higher temperature, because the contact area is larger.

9.9

391. SINNOT, J. - DUNKERTON, J.: A Method for Measuring the Kinetics of Saliva Production in Humans.

The School Science Review, 62, 1980, No.218, pp.76-77 .

Saliva production in humans can be caused by touch, by sight, by smell or by thinking. In order to precisely measure saliva production, which is impossible to do during spontaneous excitation, the author describes a simple method where balls of cotton wool are placed under the tongue in two minute intervals. The production of saliva then attains an uninterrupted and easily measurable flow which can be measured by weighing the cotton wool balls.

9.8
392. STAMMER, W. - STORRER, J.: Bau einer "Skinner-Box" zur Demonstration des operanten Konditionierens.
/Building a "Skinner-Box" for demonstrating operational conditioning./

Der Biologieunterricht, 16, 1980, No.4, pp.81-87.
3 figs., 1 tab.

The author describes the building of a "Skinner-Box" for demonstrations in ethology teaching where the behaviour of animals can be observed. In these experiments the influence of the external environment on an animal is studied; specific behaviour is rewarded and thus is learned, so that it occurs more frequently. Operational conditioning was studied above all by behavioural scientists. In the experiment described, the animal increases its movement inside a cage when an illumination bulb is lighted and for this movement it is rewarded with food. The author recommends the use of the Golden hamster for the experiment, or a gerbil or a Peruvian guinea pig. The building of the experimental apparatus is described in detail, as well as the training of the animal.

9.8
393. STOREY, R.: The Advantages of Chlorophyll Extraction with Alcohol.

The American Biology Teacher, 42, 1980, No.3, pp.180-181.

Laboratory studies of chlorophyll and other pigments are nothing exceptional in a general biology or botany course. Almost all laboratory manuals recommend the extraction of pigments with acetone. Because acetone is a very dangerous chemical, the author recommends replacing it with ethylalcohol, which is just as effective - or with methylalcohol. The article describes the practical use of both types of alcohol in detailed recipes.

9.8
394. STROBL, G.: Erfahrungen mit dem Modellversuch zum biologischen Gleichgewicht. /Experiences with a model experiment on biological equilibrium./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.2, pp.60-61.

The author describes his own experiences with a model experiment concerning biological equilibrium, which was described by Dylla, Ruben and Schaefer in an article in No.7, 1978 of the same journal. He describes the graphic representation of the findings and suggests several improvements in the apparatus for the experiment which improve the movement of the balls which represent individuals of an animal population. The author also recommends the use of a plate with small wooden legs and making a larger number of experimental kits so that pupils can work in groups /one for each 6 pupils/. The purpose of the experiment is to study the ecological laws which govern the relations between a carnivorous predator and its prey.

9.8

395. THEISS-SAUBERLING, H.B.: *Schulversuche zur Einführung in die Strahlenbiologie und Strahlenchemie.* /School experiments as an introduction to the biology and chemistry of radiation./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.4, pp. 119-125.
5 figs., 3 tabs.

The author discusses various opportunities for introducing pupils from the upper grades of secondary school to the foundations of the biology and chemistry of radiation. He describes some suitable experiments which yield basic information on the biology and chemistry of radiation. Grains of wheat are exposed to 4 different doses of x-ray radiation and their germinating capacity is studied. The chemical effect of x-rays is demonstrated on the forming of Fe^{III} ions and Fe^{II} ions. These reactions can also be used to determine experimentally the dose of the radiation. Previously, the impact of radiation was a subject of interest only to scientists, but today they can also be demonstrated in school. The author describes his own experience with teaching this problem. The experiments described were verified at a secondary school in Linden, where an x-ray facility belonging to the University in Biessen was used. Instructions concerning dosimetry were provided by prof. H. Glubrecht from the Institute of Biophysics at the University of Hannover. The experiments concerned the irradiation of grown wheat and a study of this wheat and controls two weeks age after the irradiation, and concerned the influence of x-rays on dry wheat, the correlation between sensitivity to irradiation and the physiological state of the wheat; the chemistry experiment concerned ions of two-valent and three-valent iron. The experiment in dosimetry was carried out with a simple school dosimeter and a simple radiation dose mediator.

9.8

396. VARTYK, K. - DUNKERTON, J.: A Method for the Quantitative Measurement of Detergent Action Using Red Blood Cells.

The School Science Review, 62, 1980, No.218, pp.78-79. 1 fig.

The authors describe a method in which they measure how a detergent /sodium chloride/ which dissolves lipids in the plasma membrane, causes red blood cells to burst and free hemoglobin into the solution. The quantity of this hemoglobin can be measured by colourmetrical methods after the remnants of the red blood cells have been removed. This method provides a reliable way of measuring the ability of a detergent to dissolve fats and for determining the share of lipids in a plasmatic membrane.

9.8

397. VORONIN, L.G. - MASH, R.D.: Opiti i nablyudeniya v kurse anatomii, fiziologii i gigieni cheloveka.
/Experiments in observing the anatomy, physiology and hygiene of humans./
Biologija v škole,54,1980,No.6,pp.39-42.

The authors provide a survey of available methods and means which can be used in teaching in the 7th class,with the aim of improving the knowledge and skills of pupils. In the microscopy of tissue specimens, pupils should be acquainted with how the specimen was made /for instance in film/. Also the self-observation of pupils can be made use of /somatoscopy, palpation, projection methods/, as well as somatometric methods, methods of anatomical comparisons, functional tests, learning conditioned reflexes, etc. Also some methods which apply knowledge gained in other teaching disciplines /physics, chemistry, mathematics/ are described, such as various medical tests, laboratory studies of factors in the environment, physiological observations, statistical methods, etc.

9.8

398. WARD, A.: Thoughts on the Style of Primary Science.
The School Science Review, 61, 1980, No.216, pp.418-426.

The purpose of the article is to describe such a method and style of teaching primary science courses which would be spontaneously comprehensible to students. Simple and clear experiments can contribute to this; they should arouse a curiosity among students and should add to their experiences. Arousing an interest among students and teaching them observation skills will lead to them examining the connections which exist between observed phenomena.

9.8
399. WILKINSON, J.R. - WELLBURN, A.R.: Rapid Separation of Plant Pigments by Thin Layer Chromatography Using Sugar Coated Microscope Slides.

The School Science Review, 62, 1980, No.218, pp.81-83 .
2 figs.

The authors describe a modification of an older procedure for the separation of plant pigments, where excellent results can be achieved in a much shorter time. The separation takes place on slides coated with a layer of sugar icing, which for this experiment is much better suited than some commercially sold chemicals. Also the method of coating the slide is described in detail and illustrated in pictures.

9.8
400. WOLF, B. - BURGER, A.: Erregungsleitung in Nervenfasern - Modell zur Ruhespannung. Versuche mit künstlichen Membranen in der Sekundarstufe II. /1.Teil./ /Causing excitation in nerve fibres - a model of rest tension. Experiments with artificial membranes in upper classes of secondary school - part 1./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.2, pp.106-108.
2 figs.

The article develops a simple model experiment for demonstrating tension at rest which exist in nerve fibres. The experiment assumes that pupils understand the physical and chemical properties of diffusion and osmosis, as well as Brown´s movement of molecules, the movement of ions from sites of higher concentration to places with lesser concentration and knowledge of semi-permeable and artificial membranes /cation semi-permeable membranes hold back anionts while anion-permeable membranes hold back cations/. The authors cite artificial semi-permeable membranes which they have verified and which are commercially available in the G.D.R. and also describe in detail the preparation for and carrying out of the experiment.

9.8
401. WOLF, B. - BURGER, A.: Erregungsleistung in Nervenfasern - Modell zum Aktionspotentiel. Versuche mit künstlichen Membranen in der Sekundarstufe II /2. Teil./. /Causing excitation in nerve fibres - a model of action potential. Experiments with artificial membranes for use in the upper grades of secondary school - part 2./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.3, pp.163-168.
4 figs.

The second part of an article where the authors on the basis of a model experiment show the development of action potential in nerve fibres, where gradually the complex physical and chemical processes which are taking place are explained: rest potential, the differentiation of electrical potential between the inner and outside area of the cell, and the transmission of K$^+$ and Na$^+$ through special pores. In a state of rest more K pores are open than Na pores, so that the membrane is more permeable for K ions. In the course of depolarization more K ions escape the cell and more Na ions penetrate it. Thus the permeability towards Na ions increases. In a similar manner hyperpolarization is explained. The advantage of these experiments is in the use of selective membranes for K ions. For Na potentials, so far suitable artificial membranes are not yet available.

9.8
402. WOOD, P.: Glutamine Synthese: An Enzyme Suited to Many Levels of Post-School Student Practical Work.

Journal of Biological Education, 14, 1980, No.2, pp. 153-162.
5 figs.

Glutamine synthese is an enzyme which is of key importance in bio-synthesis. The author provides instructions for various post-school practical expercises with a number of bie-chemical techniques which provide proof of those theoretical conclusions important especially for micro-biology and bio-chemistry. He describes in detail methods and findings of experiments, accompanied by tables, diagrams and photographs. In the discussion he comments the findings. The purpose of the excercises is to the support practical thinking of students in post-school training.

9.8

403. YAVORNITZKY, J. - TRZECIAK, V.: A Classroom Modification of the Ames Test.

The American Biology Teacher, 41, 1979, No.7, pp.399-401.

The Ames test is a method of determining carcinogenic and mutagenic substances where a bacteria colomy is used as the testing organism. Of 158 known carcimogenic chemicals, 135 can be determined as mutagens with the aid of this test. Originally the test used bacteria of the Salmonella genus. The authors of the article have replaced it with Escherichia coli, which is entirely safe and makes it possible to carry out these laboratory excercises in lower grades. The preparation of the material is described in great detail. The minimum medium used contains a 20% solution of glucosis, sterile water, 2x agar and a Bonner-Vogel E medium. Precise instructions are provided for setting up the experiment. The authors also cite recipes for all substances. The testing itself is also described in detail, as well as the findings which should be arrived at.

10

404. BULÍŘOVÁ, S.: Přírodopis v 5. ročníku experimentální školy. /Nature studies in the 5th class of an experimental school./

Přírodní vědy ve skole, 31, 1979/80, No.9, p. 333.

The author describes her own experiences and provides a survey of the natural objects which teachers can prepare in advance so that teaching in the 5th class of basic school can then go ahead smoothly. In spite of the fact that the syllabus attempts to take the seasonal principle into account, it is nevertheless necessary to prepare in advance various natural objects preserved in formaline, pressed herbariums, herbariums containing various phenological stages, collections of dried fruits, samples of moss and lichen and also the cultivation of indoor plants.

10
405. KADEŘÁVKOVÁ, J.: Informace o opravnách učebních pomůcek.
/Information on repair shops for teaching aids./

Přírodní vědy ve škole, 31, 1979/80, No.6, pp.212-214.
1 tab.

The article provides a survey of places where it is possible to have teaching aids repaired.

10
406. LIEB, E.: Anschauugsmittel im Biologieunterricht.
/Ostensive teaching aids in biology./

Der Biologieunterricht, 16, 1980, No.4, pp.30-33.

The author deals with the present state and future outlooks for the use of teaching aids in biology. He also describes the history of the problem and the extensive development of various types of teaching aids and the production of complex and expensive instruments which make it possible to show films, slides, tape recordings, transparencies etc. However, biology is the science of life and requires not so much instruments and means which separate teaching and living nature, but rather real nature and instruments which make it possible to work with natural objects. The making and use of teaching aids in biology shoubd be governed by the pragmatical principle that the teacher should first verify and test everything and actually use in class only the best of the lot for the actual process of teaching and learning. The author considers the most valuable and best teaching aids to include a magnetic board, a film projector, a slide projector, a overhead projector, a microprojector, slides and transperencies.

10
407. ROZENSHTEYN, A.N.: Printsipi sostavleniya i ispolzovaniya komplekgov uchebnogo oborudovaniya. /The principles of designing and using complexes of teaching aids./ Biologiya v shkole, 54, 1980, No.1, pp.31-34.

By the term "complex of teaching aids" S.G. Shapovalenko defines the optimum quantity of mutually interconnected aids /components/ for use in teaching, which are needed for the teaching of the given syllabus and curriculum. This complex should be designed in relation to the educational and teaching tasks of the given subject, its optimum methodology and the amount of time devoted to the given problem. They should be approached as a whole with a precise structure /its components are linked together by their content and methodology of teaching/, they should not be doubled. The methodology of designing and use of the complex of teaching aids is demonstrated by the author on the basis of the example of a lesson on single cell algae in the 4th class. The complex for this purpose includes three tables: one which analyses the content of the lesson, a table with information on available types of aids concerning this subject and a table of the functional and didactical characteristics of these aids in relation to the aims of the lesson. In class those aids are actually used which in table 2 and table 3 have the most frequent relation to the proper learning of the topic.

18.1

408. MAJKOWSKA, J.: *Środki dydaktyczne w powszechnej szkole średniej.* /Didactical media in general education secondary schools./

Biologia w szkole, 33, 1980, No.2, pp.94-95.
4 figs.

The teaching media for biology in Polish general education secondary schools aim at the activation of pupils and are designed for use with methods which follow this aim. Attention is now being devoted to the furnishings of biology classrooms and their facilities for the mounting and preservation of biological specimens and for field work during which this material is collected. The author describes in detail the work connected with forming collections of specimens for biology, how specimens in liquids can be kept in jars, how to keep collections of seeds and fruits or other parts of plants, how to make herbariums, how to preserve osteological material, bird feathers, shells and chonches, mushrooms and models of natural objects. The author points to the possibility of keeping press clippings and copies of drawings from specialized literature and explains how such material should be classified and stored. All this can be done by pupils whose activity is thus increased. It can serve to improve the motivation for individual work by pupils and also as ostensive teaching aids for use in class work.

10.1

409 SZYLARSKA, E.: Sprawozdanie z badań nad środkami dydaktycznymi w klasie IV. /A report concerning an investigation of didactical media in the 4th class./

Biologia w szkole, 33, 1980, No.4, pp.229-232.

The author reports on an investigation undertaken to assess the facilities available to experimental schools for biology teaching and the teaching of hygiene in the 4th class of a general education secondary school. It was found that the facilities available to the schools, in view of the demands made by the curriculum and syllabi, are insufficient. New topics taught within biology, such as ecology and environmental conservation, require a number of various new teaching media. The development of such media should be intensified and they should be used on a mass scale in the schools. New syllabi and new teaching forms require media for individual and experimental work of pupils; also variour manuals and handbooks, such as keys, atlases and popular science books should be made available. Also an insufficient number of films and slides are available which deal with problems found in the biology syllabus. The Institute of School Curricula has investigated approximately 45 classes in 19 different schools and assessed all the media used by their teacher on the basis of the experimental syllabus and made specific suggestions for acquiring the new teaching media.

10.2

410. TAMIR, P. - SEVER, E.: Students' Attitudes Towards the Use of Animals.

The American Biology Teacher, 42, 1980, No.2, pp.100-103, 109.

A number of studies have indicated that children of various ages prefer to learn about animals rather than plants or micro-organisms. Also teachers prefer to teach about animals, because this presents fewer difficulties. The authors enumerate both positive and negative aspects of the use of animals in experiments. The main purpose of the project reported on was to study the attitudes and opinions of students to the use of live animals in biology teaching and to determine the specific premises of these attitudes and opinions.

10.23

411. POPOV, K.K.: Ispolzuvaneto na staynata oranzheria - reserv na kachestvena podobryavane na obuchenieto po biologiya. /The use of an indoor green house for improving the quality of biology teaching./

Biologiya i khimiya, 23, 1980, No.1, pp.27-33.

The first part of the article stresses the importance of an indoor green house for various purposes: cultivating or breeding living material for biology lessons, starting various longenterm experiments in physiology, the cultivation and temperature control of various plants.

In the second part of the article the author provides instructions for building such a greenhouse, and provides two picture. The first shows the main frame of the greenhouse which is mobile and can be covered with glass to various extents. Over the frame, glass panels are placed, thus producing an environment where the temperature and amount of light can be controlled.

The third part of the article contains various suggestions for the best utilization of the greenhouse.

10.26
412. ALTMANN, A.: Strunatci v koutku živé přírody I.
/Chordata in a Living Nature Corner of a biology classroom - I./
Přírodní vědy ve škole, 31, 1979/80, No.1, pp.9-10.

The article serves as an aid for zoology teaching in the 6th class of basic school, according to the new curriculum and syllabi. The new model of teaching requires the use of original objects in teaching and among them living organisms are the most important. For this reason the author calls for the collection and breeding of suitable chordata, which can be kept in Living Nature Corners of classrooms. He provides a survey of fishes, amphibians and reptiles which are suitable for breeding in school conditions and sums up the main principles of breeding these animals; he also provides a bibliography of suitable literature, which can serve as a further aid for the teacher.

10.26
413. ALTMANN, A.: Strunatci v koutku živé přírody - II.
/Chordata in Living Nature Corners of biology classrooms II./
Přírodní vědy ve škole, 31, 1979/80, No.2, pp.50-51.

The article helps teachers and pupils in their work in Corners of Living Nature in biology classrooms. The author provides information on how to keep birds and mammals in conditions provided by a classroom.

10,26

414. AVERICHEV, Y.P. - KOPANEVA, E.M.: O privlecheniyi uchashchikhsya obshcheobrazovatelnikh shkol k razvitiyu krolikovodstva. /Convincing the pupils of general education secondary schools to breed rabbits./ Biologiya v shkole, 54, 1980, No.5, pp.63-65.

The article develops the ideas contained in a common resolution of the Central Committee of the All-Union Leninist Communist Union of Youth /Komsomol/ and the Collegiums of the Ministries of Agriculture and Public Education from June 1980, called "On the Mass Persuasion of Komsomol Organizations, Young Pioneer Groups, Working Youth, Young Pioneers and Pupils to Develop the Breeding of Rabbits". It stresses that the breeding of rabbits can play an important role in the rapid increase of dietary meat and fur products and that it can be undertaken by broad masses of the population, youth and young pioneers. In some regions of the countra pupil work teams for this purpose are already functioning, they care for rabbit farms with up to 1500 rabbits in them. Individual groups divide the tasks among them so that every member of the team works on the farm about 4 hours per week. Also the knowledge gained by pupils in the course of the teaching subject work education can be used. The subject of caring for rabbits is included in the curriculum.

10.26

415. BUTLIN, A.: Small Tortoise Shells in the Classroom.

Natural Science in Schools, 17, 1979, No.1, pp.9-10.

The Tortoise shell butterfly is a specie suitable for breeding in the classroom. It can be used for this purpose already with 5 year old children, who can learn about insects from its observation. One of its advantages is its relatively short development - 6 to 8 weeks. Also the large number of laid eggs assures a sufficient number of butterflies for use in several classes and also the caterpillars of this butterfly are easily found and captured outdoors. The article describes in detail the development cycle of the Tortoise shell butterfly and provides practical information for its breeding. It is best to collect the caterpillar stage because the eggs are too small and it is difficult to find them on leaves. On the other hand the adult butterflies will probably not multiply in captivity. The author also discussed the feeding of the larvas and the adult butterflies, the type of cages they need and how to handle them.

10.26

416. CLOUDSLEY - THOMPSON, J.I.: Woodlice as Material for Research Projects.

Journal of Biological Education, 14, 1980, No.2, pp. 107-108.
6 figs.

Wood_lice of various species /Trichonisons pusillus, Philoscia muscorum, etc./ can be easily obtained throughout the year. They can easily be kept in captivity where they multiply just as they do in their natural environment. Their behaviour is relatively simple and provides classical examples of movement and taxis. Microecological studies described by the author include their collection, observing their nocturnal activities, population studies, observing their enemies, their behaviour when confronted with enemies and also laboratory experiments. For pupils in the upper classes of secondary school this can provide a good introduction to the ecology of micro-organisms.

10.26

417. DREIDAX, F.: *Einstellungen von Vogelzüchtern z ihren Tieren.* /The attitude of bird breeders to their animals./

Praxis der Naturwissenschaften, 29, 1980, No.5, pp. 140-145.
21 tab.

Between October 1978 and January 1979 those who keep birds in the district of Weser-Ems in Lower Saxony received questionnairs which concerned the time, when and how their relationship to birds developed, what their attitude towards birds today is and what is the significance of the hobby for the respondent. One of the reasons for this project was to provide facts for teachers so that they can devote greater care to the breeding of animals, organise visits to those who breed animals and to make use of all this in biology teaching. Keeping pets is at present very popular, because man, to a growing extent, feels deprived of nature. Keeping animals can be of great educational significance for pupils. The repondents to the project included bird keepers aged from 17 to 91 years. 63% of them kept cage birds, 23% kept pigeons. There were 105 men and 11 women among the bird keepers. 85 lived in rural areas, 31 in urban areas. 64% said they liked birds since childhood /between 5 and 10 years/. A positive relationship towards animals was first was expressed for pigeons /38%/, for a dog /24,5%/, chickens /22%/, parrots /12%/, cats /9%/, etc. The majority began keeping animals between the ages of 5 and 15. A large percentage /79.4%/ cited the influence of their parents in this respect. Almost 40% keep those animals which already their parents had as pets. 61.2% have had the same specie of animal as a pet since the beginning /since childhood/. The earlier a person gets to know an animal closely,the longer the duration of the relationship. 75% of pet owners are willing to show their pets to school children and agreed to a visit of school children with their teacher. The project indicated the positive influence of keeping pets on the personality of young people.

10.26

418. GRAFTON, T.S.: Live Animals for the Biology Classroom. The American Biology Teacher, 41, 1979, No.7, pp.410-412.

Live animals are capable of attracting and keeping the attention of children. In the classroom and laboratory they serve many purposes. In the course of observing animals, pupils learn about the foundations of biological theory and become acquainted with such problems as feeding, reproduction and behaviour; when taking care of an animal the feeling of personal responsibility is strengthened. Various excercises contribute to developing pupils´ critical and creative thinking and teach them to draw and formulate conclusions on the basis of acquired data. The author also discusses the opinion of some animal lovers who are against the use of animals for biological or medical experiments and teaching, and cites various attitides towards this problem. Also the possibility of solving this problem in school, from the point of view of the teacher is discussed.

10.26

419. HEALEY, R. - TURNER, S.C.: Culturing Embryos and Larvae of Marine Molluscs and Protochordates.

Journal of Biological Education ,13, 1979, No.3, pp. 163-170.
8 figs.

Marine molluscs and protochordata can be used as a source of gamets for the practical demonstration of an animal´s development. The article describes the method of obtaining the gamets and breeding the embryos and larvae in vitro. The selected species /the genera Littorina, Pattela, Ciona, Styela and Phaeodactylum/ can be kept in a simple and inexpensive apparatus, which the authors describe in detail. The optimum conditions required for breeding these organisms are summed up into 6 points. The breeding of the genus Phaeodactylum is cited as an example. Part of the article is devoted to a survey of how to determine various species and how they can be used in teaching. The authors describe various experiments in detail and the subjects of observations.

which can be organised: metamorphosis, the development of the eggs, fertilization, the polarization of the egg, the agglutination of sperms, etc.

10.26

420. KAMÌNSKI, K.Z.: Òsliozka obiektem hodowli szkolnej. /The crustacean Asellus aquaticus as an object of breeding in school./

Biologia w szkole, 33, 1980, No.5, pp.293-294. 1 fig.

One of the most frequently found representatives of the Isopoda is the crustacean Asellus aquaticus. It is found in large numbers in unpolluted lakes, ponds or the litoral part of eutrophic lakes. It eats plant parts and can easily be bred and observed throughout the year. It provides a suitable substitute for crayfish. The author describes two alternative methods of breeding this crustacean, which have both been tested. In one, a tray for photography chemicals can be used, while the second uses an aquarium. Asellus aquaticus is best fed with dried poplar and aspen leaves. The second method requires an aquarium with flowing water. In the floor of the aquarium a hole is drilled to which a tube is fastened and covered with a piece of gauze. At the top another tube brings fresh water. The crustaceans are suitable for a number of interesting experiments and for observing the morphology of the animal.

10.26
421. MINIMA, I.S.: Krolikovodstvo. /Bredding rabbits./

Biologiya v shkole, 54, 1980, No.1, pp.14-20.
5 figs., 2 tabs.

One of the basic tasks which follow from the resolution of the Central Committee of the Communist Party of the Soviet Union from 1978 is an increase in the production of meat, including rabbit meat. By 1985 127 000 tons annually should be produced. The main part of the article is devoted to instructions concerning the breeding of rabbits and a description of the 11 breeds which are most frequently found in the USSR. Correct methods of feeding are also described in detail.

10.26
422. MININA, I.S.: Organizatsiya shkolnoy krolikovodcheskoy fermy. /The organisation of a school rabbit breeding farm./

Biologiya v shkole, 54, 1980, No.6, pp.62-64.

The article continues in a previous article by the same author published in No.1/1980 of the same journal. The author recommends a rabbit farm with at least 30 female rabbits and describes the experiences of such a farm and especially the organisation of pupils´ work on such a farm.

10.26

423. National Science Teachers Association: Code of Practice on Animals in Schools.

The Science Teacher, 47, 1980, No.6, pp.57-58.

The National Science Teachers Association has drawn up a code concerning the treatment of animals used in the course of teaching the natural sciences in basic and secondary schools. This code has been adopted throughout the United States; it defines the obligations of teachers or those dealing with animals, as far as their living area, feeding, use in experiments, etc. are concerned. The code includes instructions concerning temperature, light, cleaning, etc. Added to the code is a list of recommendations concerning the use of living animals in class, and a list of factors which are harmful to animals such as various chemicals, low or high temperatures, overfull cages or pens, etc.

10.26

424. Ob usileniyi vnimaniya k vospitaniyu gumannogo otnosheniya shkolnikov k zhivotnim. /Towards devoting greater attention to the education of a humane attitude of pupils towards animals./

Biologiya v shkole, 54, 1980, No.4, pp.44-46.

The article contains a summary of a recommendation of the same name addressed to the staff of schools, to devote increased attention to these problems during all stages of the teaching and educational process. This education should be considered as an important link in the forming of a mentally developed and morally fully valid personality of a young person.

10.26

425. ORIANS, F.B.: Selecting an Animal for Classroom Use.

The Science Teacher, 47, 1980, No.2, pp.29-33.
8 figs.

Some small animals can be kept directly in the classroom, for the pleasure and instruction of children. The only problem is that we must know which animal can be kept in this way and how, so that neither the animal nor the children in the class suffer. The author describes, on the basis of her own experiences, what to do and which animals are especially suitable for such a purpose. Also those animals which are entirely unsuited for such a purpose are cited: some can be dangerous either as transmitters of disease or because of their natural behaviour. Also the cages or pens in which animals can be kept are discussed.

10.26

426. RESNICK, J.: Animal Care Studies with a Vocational Thrust.

The Science Teacher, 47, 1980, No.1, pp.33-34.
2 figs.

The article deals with the best methods of dealing with animals which are used for experiments or for observations in schools. The school authorities have drawn up for this purpose a program of care of these animals by school children, which follows educational and teaching aims, and which teachers can further develop on the basis of the conditions existing in their school.

10.26

427. SMIRNOV, O.P.: Soderzhaniye yaponskikh amandin v shkolnikh ugolkakh zhivoy prirodi. /Keeping the Weaver finch in classroom Living Nature Corners./
Biologiya v shkole, 54, 1980, No.1, pp.46-47.

The author describes in detail experiences with keeping the Weaver finch /which has been bred in Japan several centuries ago/ in school. He also discusses the birds' food and recommends especially millet and 10-15% of Canary grass with some wheat, bread, carrots and green fodder. During the summer vacation the birds can be given to members of the biology hobby club who can take care of them at home.

10.261

428. PETZOLD, H.G.: Bedeutungsvolle Nachuchten im Tierpark Berlin - eine Bilddokumentation mit Kommentar. /Significant breeding successes at the Berlin Zoo - a pictatorial documentation with commentary./
Biologie in der Schule, 29, 1980, No.11,pp.486-489.
16 photographs.

The Berlin Zoo was founded 25 years ago. It has achieved a number of breeding successes and thus gained an excellent international reputation. The author acquaints the reader with the most important of these successes. These include the Cuban iguana /Leiocephallus carinatus/ and the Cuban grass snake, the white penguin, the Marabou stork, the rare American Bald eagle, the orangutan, the Siberian tiger, the rare Felis bengalensis and the Persian lion, the Malay bear, the Somalian wild ass, the Arabian oryx, the bontebok, fallow deer and Budorca taxicolor.

10.261

429. SCOTT, A.R. - HENRY, R.D.: Developing an On-Campus Environmental Garden.

The American Biology Teacher, 41, 1979, No.1, pp.18-20.
3 figs., 1 tab.

The authors describe an "environmental garden" which was developed and built at the campus of the Western University in Illinois. The garden simulates a number of various environments, including flowing and non-flowing waters, a prairie, a forest, etc. and thus provides opportunities for field work, as well as material for laboratory excercises. The authors describe in detail how the garden functions, its organization and also some of its problems. The garden covers an area of 350 x 200 yards and includes 6 different biotopes, including a coniferous and deciduous forest, prairie land, sandy soil, an aquatic environment and a field which had been cultivated for a long time. The most important are plants, but also animals are found here, both invertebrates and vertebrates.

10.27

430. BELL, D. - BELL, W.: A Simple Approach to the Study of Attached Micro-algae.

Journal of Biological Education, 14, 1980, No.1, pp. 3-9.
4 figs.

The use of an artificial substrate in which to study attached micro-algae is a very fiesable experimental technique which is well suited for use in schools. The attractiveness of the method is that it is possible to observe the algae as it grows on an artificial substrate, which can be formed by a piece of wood, slate, concrete, asbestos, metal, etc. However, the material which is most frequently used is glass, usually in the shape of a slide used for microscopy. The authors describe and show in pictures how such a culture can be started, methods of microscopy used, the measurement of chlorophyll and assessment of population growth, as well as the changes such populations undergo when a change in the environment occurs.

10.27
431. CAMPION, M.: Fern Spore Development.

The School Science Review, 61, 1980, No.217, pp.695-697.
2 figs.

For a study of fern spores usually a great deal of energy is expanded on keeping the material used sterile. A technique which uses a liquid culture is thus much more simple. The author provides a detailed description of the method used, beginning with the collection of spores in the late summer, up to the development of the spores under white light and under red light. The pictures provided illustrate the difference in the thickness of the spores obtained and their shape.

10.27

432. MUSIL, J.: Spolupráce PO SSM a školy v pěstitelské činnosti. /Cooperation between the Young Pioneer Organization of the Socialist Union of Youth and schools in cultivation and breeding activities./

Přírodní vědy ve škole, 31, 1979/80, No.10, pp.368-370.

Rural schools have much better conditions for cultivation and breeding activities. Children here are especially interested in botany, zoology and cultivation and breeding activities. In urban schools children also like to cultivate flowers, vegetables, fruit and decorative trees. The problem usual is to find someone with expert knowledge to advise hobby clubs on these subjects and also finding the needed space outdoors. An agreement signed between the Ministry of Education and the Ministry of Culture on May 24th, 1972 declares, among others, that "these institutions shall provide help to the Young Pioneer Organisation of the Socialist Union of Youth in finding instructors, Young Pioneer leaders, especially from among teachers and parents... and shall lend, free of charge, areas as well as facilities for such activities".

10.27

433. STEEDMAN, R.J.: Growth of Algae on Artificial Substrate.

The American Biology Teacher, 42, 1980, No.1, pp.23-26. 6 figs.

The study of biological processes in nature can be replaced in some cases with inexpsensive laboratory excercises. The article describes the opportunity to systematically observe the development of an algae colony and its structure and function, the effects of polluted water and other phenomena, in the comfort provided by the laboratory.

10.27

434. THORPE, P.: Trees from Seeds.

Natural Science in Schools, 18, 1980, No.2, pp.43-45: 2 tabs.

An epidemic disease of elms in the vicinity of Arun in Great Britain has caused a devastation of the Landscape. In 1979 the cultivation of new trees was begun; it was decided that the planting of the new trees would be done by students of secondary schools. The students first cultivated seedlings of adlers, birch, horse chestnuts, larch, oaks, pine and wild cherries. The seedlings were transferred to a tree nursery and finally replanted in the forest under the supervision of teachers. The work is not yet complete and is scheduled for several years. The article describes the whole course of the program and the activities of school children in the project.

10.27

435. THORPE, P.: Trees from Seeds - II -Planting the Seeds.

Natural Science in Schools, 18, 1980, No.3, pp.62-64.

The author continues in an article published in the same journal in a previous issue. Here he discusses the best time for the collection of seeds, how they should be stored, how to cultivate them, how the soil should be loosened, its temperature and optimum amount of moisture and other problems connected with the successful germination and growth of the seeds. He recommends keeping a diary where at regular intervals the development of the seeds is recorded; also sketches can be made or photographs added.

10.27

436. WEBER, R.: Anregungen zur Gestaltung von Schulgärten unter Berücksichtigung der Belange des Biologieunterrichts. /Incentives towards building school gardens in view of the demands made by biology teaching./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.1, pp.21-28.

Botany teaching is at present impossible without the use of original objects, without having the plants or their parts which are the subject of teaching present in the classroom. The author describes his own long-term experiences concerning the use of school gardens for botany teaching; also ornamental shrubs can be cultivated in school gardens. He recommends planting various woody species specific for the needs of schools and which can be used in instruction. Pupils can learn how to use keys and atlases, they can do morphological excercises, experiments with plant material, etc. For every recommended plant, the author discusses its use in teaching. Also animals found in a school arboretum can be used in teaching.

10.27
437. WIECKOWSKI, Z.: Zestaw do przyspieszonej uprawy roślin.

/A kit for plant temperature control./

Biologia w szkole, 33, 1980, No.2, pp.108-110.
3 figs.

The author describes a kit which can be used to accelerate the growth of cultivated plants. He recommends using it for tomatos and describes how to use the kit, how to prepare the soil, fertilize, etc. He recommends liquid fertilizers /Florovit which contains both macro-and micro-elements/. Side shoots should be cut off, so that the plant grows high enough and provides a large crop. The author cites crops of 10 tomatos per shrub, with each tomato 8 - 10 cm in diameter. For each tomato shrub he used 100 g of Florovit, which is inexpensive.

10.27
438. WOOD, H.J.: Introducing the genus Pelargonium.

Natural Science in Schools, 18, 1980, No.3, pp.54-61.
3 figs.

The British Geranium Society was founded to support the cultivation and appreciation of this genus of decorative flowers. The author, who is a member of the Society, provides knowledgeable, but understandable information for students on what is needed for the cultivation of the flowers, beginning with soil treatment, composting, methods of propagation and cultivation, the use of a greenhouse and finally a calander of various steps in geranium cultivation from January until December. Schools can cultivate geraniums to decorate their school building.

10.271

439. AGARDY, S.: "Mikro botanikus kert" létesítése. /Planting a "micro-botanical" garden./

A biológia tanítása, 19, 1980, No.5, pp.192-193. 1 fig.

The author provides information on the planting of a small botanical garden attached to a school. He writes on how to collect plants and when and how to plan a garden which can then serve as an ostensive teaching aid. Some of the recommended species are described in detail. The picture outlines the garden plots and the lay-out for 50 species of plants.

10.271

440. KINGSBURY, P.A.: School Gardens for Wildlife.

Natural Science in Schools, 17, 1979, No.2, pp.42-44. 3 figs.

Gardens and free areas found in the vicinity of schools, hospitals and other public buildings can be made use of for nature conservation. The article concentrates on the planning and cultivation of such a school garden. First the problem of hedge rows is discussed, then various shrubs, trees and clinging or creeping plants. Then small shelters for various animals are discussed, such as woodpeckers, microtines, frogs etc. Insects require specific types of plants, especially those which have red and blue flowers. Also a small lake should be part of such a garden and the building of such a small water area is described. In conclusion the author discusses the uses to which such a garden can be put and its role in nature conservation efforts.

10.271

441. STAVROVSKIY, A.Y.: Shkolniy uchebno-opitniy uchastok.
/A school plot of land devoted to study and experimental purposes./

Biologiya v shkole, 54, 1980, No.4, pp.63-67.

The importance of school plots of land is generally acknowledged. They also serve to strengthen interdisciplinary relations among biological disciplins and to better concentrate on problems of agriculture and work education. The plots of land available to schools usually have 0.25 to 2 ha area. The author recommends dividing the plot of land into 9 areas with different purposes:

- a department for the 1st to 3rd classes
- vegetable plots /for 4th and 5th classes/
- field crops /for the 6th class/
- department of fruit trees and berries with nursery
- department for providing samples to collections, especially of economically important plants
- biology department /according to the needs of biology teaching/
- flower beds
- dendrology department
- zoology and breeding department /with 15-20 cages with rabbits and bee hives/.

Also an outdoor classroom and a meteorological station should be built on the plot of land.

10.273

442. CSIZMAZIA, G.: A múseumi gyermekfoglalkozások szerepe a kreatív gondolkodás fejlesztésében. /Childrens' activities in museums as a method of developing creative thinking./

A biológia tanítása, 19, 1980, No.5, pp.167-170.

In the introduction the author expresses the opinion that pupils usually have an ungratified curiosity to learn about life in their vicinity. It seems to them that the sum of knowledge they gain in school is insufficient to deal with the every-day problems they encounter. Children want to be able to make responsible decisions on their own in various conflicts. This is a valid demand on the part of children, for which schools cannot provide sufficient conditions. The author makes various suggestions for improving this aspect of education. The Móra Ferenc Museum in the town of Szeged has achieved very good educational results when members of the museum staff volonteered to work with school children interested in the natural science. A plan was drawn up which included various topics of study, the organisation of activities, etc. The development of the pupils' creative thinking is considered to be the most inpertant contribution made by the project.

10.3

443. HEIDCAMP, W.H. - BEARD, W.R.: Biotechniques for Freshmen.

The American Biology Teacher, 41, 1979, No.1, pp.52-53,64.

The article describes a new course in experimental biotechniques at the Gustav Adolf Natural Science Faculty. The theoretical aspects of the techniques receive standard treatment and then each technique is excercised in controlled, independent laboratory excercises. The students learn microscopy, how to collect and breed laboratory animals, methods used for mounting permanent specimens, the foundations of physiological measurements and the use of radio isotopes. The students record their findings and prepare essays or term papers on their basis. The content of the whole course is described in detail, and a general assessment is provided.

10.3

444. SERBRYAKOVA, A.N. - SHVECHIKOVA, A.P.: Izgotovleniye kollektsiyi selskokhozyastvennikh rasteniy. /Making a collection of agricultural plants./

Biologiya v shkole, 54, 1980, No.5, p.36.

The author describes methods for preserving fruits and berries, taproots, roots, and other organs of plants for use in class. The clean and dry fruits or roots should be wiped with cottonwool soaked in alcohol and then submerged for several seconds into melted paraffine wax /heated to 75 - 78°C/. After cooling and drying the fruit or vegetable can be stored.

INFORMATION BULLETIN

THE DIDACTICS OF BIOLOGY

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10.32

445. KOROTKOV, G.P.: *Kollektsiya gribov dlya kabineta biologii.* /A collection of fungi for the biology study room./

Biologiya v shkole, 54, 1980, No.5, pp.37-40.

During an excursion to a forest pupils can observe and collect samples of leaves, berries or other parts of forest plants which have been attacked by some fungus. A maximum of 3 - 5 samples of each type of fungus should be collected. Notes should be taken on when and where the sample was taken; this will make the later identification of the sample easier. The article also contains the outlines and descriptions of 11 species of frequently found Polyporaceae fungi. After identification, the collected material should be dried or the teacher can preserve it with 40% formaline. It can then be placed in boxes. The collection should be renewed every year.

10.45

446. SCHWETSCHKE, U.: *Entomologische kleinsammlungen als brauchbares Unterrichtsmittel.* /Small insect collections used as a teaching medium./

Biologie in der Schule, 29, 1980, No.4, pp.142-143.

When teaching the topic Insects in the 6th class, teachers often have problems with finding natural artefacts. For instance for explaining the body structure of insects it is very useful to have specimens of insects. The pupils in the district of Sangerhausen have prepared a small collection of insects. Each small glass case contains 6 representatives of domestic insects. It can been used during instruction in the 6th class and also in the 9th and 10th classes.

10.46
447. ANKEY, R.J.: Ankle Bones Connected to the Foot Bone.
The American Biology Teacher, 41, 1979, No.1, p.50.

One of the problems which arise in teaching an introduction to anatomy and physiology is the demonstration of the small bones found in the human wrist, hand and ankle. During teaching both individual small bones should be available, but also the whole skeleton of the ankle and leg. The author describes a method for freely connecting these small bones in such a way that they can easily be taken apart and put together again. The connections are made of "Velcro 40", which are joined by a special glue.

10.51
448. MAGULYAYEV, A.Y.: Prigotovleniye vremennikh tsitologicheskikh preparatov. /Mounting temporary cytological specimens./
Biologiya v shkole, 54, 1980, No.3, pp.45-46.

The author here modifies the usual methodology used for demonstrating mitosis in the small roots of an onion, by staining with aceto-orceine or aceto-carmine. It is suggested that germinating seeds of rye, barley, peas /for all these 2n = 14/, maize /2n= 20/, onions /2n= 16 or 32/ be used. Besides the above mentioned pigments also aceto-lacmoide and aceto-fuchsine are recommended. The method of synchronizing cellular division is described: a germinating seeds with root length 0.5 to 2 cm, should be put in a refrigirator where temperatures are around 0°C between 7 and 8.30 A.M. After 24 hours they should be taken from the refrigirator and fixed for 15 minutes in a mixture of alcohol and glacial acetic acid at a ratio of 3:1. Such material can then be preserved in 70% alcohol at temperatures between 3-4°C for about a year.

lo.61
449. BECKER, P.D. - LESCHIK, E.: Chemischer Oszillator als Modell für biologische Schwingungen. /A chemical oscillator as a model for biological reactions./

Praxis der Naturwissenschaften Biologie, 29, 1980, No. 8, pp.233-237.
9 figs.

The author describes the conditions needed to carry out an experimental demonstration of spatial and temporal oscillations in a "Belousov-Zhabotinski" reaction. Essentially this deals with cerium ions in a bromide catalyzed decarboxylate of melanin acid in a sulphuric acid solution. The fluctuations of the system can be observed for several hours when the cerium ions regularly change colours between yellow and colourless. After adding ferroine we obtain oscillating colour changes between red and blue. During spatial oscillation spiraling rays or other complicated coloured structures appear, which seem to emanante from a single center. These reaction can serve as models /Brady, Belousov, Zhabotinski/. The author cites instructions for demonstrating the experiment with the described reactions in class.

10.61
450. DANZMAN, J.: Die Organisation Nucleosomen als Bestandteile der Chromosomen. /The organisation of nucleosomes as parts of chromosomes./

Praxis der Naturwissenschaften-Biologie, 29, 1981, No. 11, pp.335-338.
4 figs.

The article deals with current ideas concerning the structure of the histone-DNA complex in eukaryent cells /organisms with a true nucleus/. It also provides instructions for buidling a model of this complex. The basic particle of chromatine is the nucleosome, a spherical particle of histone with a diameter of 100 A, which contains 140 pairs of spiral bases DNA; H2A, H2B, H3, H4 and H1 are known histones. The model is based on the assumption that two of the H2A, H2B, H3 and H4 histones are present in the nucleosome. For every 100 pairs of bases in a chromosome there is one histone - in other words for 200 bases approximately 2 histones. We assume that nucleosomes contain probably 4 histones in the same quantity. The model is made of wooden balls, which are 50 mm in diameter and are painted in various colours. A tube made of PVC with a diameter of 10 mm, a magnet and an electrical cable are also needed.

10.51
451. DIETRICH, K.: Quetschpräparate- Dauerpräparate. /Pressed specimens-permananet specimens./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 9, pp.280-281.

The author deals with the possibility of making pressed specimens into permanent specimens. He tested the method and recommends that the pressed specimens be made permanent by using synthetic resins. Two methods were tested: the Daumer method from 1975 and the dry ice method by Linnert /1977/ and Gölzenboth /1978/. The dry ice method is better because it provides reliable specimens to illustrate mitosis, meiosis during cell division, nerve cells of the grey cerebral cortex, etc.

10.61

452. DOMKA, L.: Kształcenie wyobrazni przestrzennej. /Making spatial images./

Biologia w szkole, 33, 1980, No.3, pp.154-159.
9 figs.

Some original biological objects require spatial observations. This is true not only in scientific work, but also when teaching in school. Three-dimensional models can be made, as well as plastic images etc., which can help the pupil to understand the model of a cell, mitosis, meiosis, the structure of chromosomes and DNA. Studies have indicated an insufficient understanding of the spatial aspects of biological objects. This improves when microscopy observations are combined with the observation of a spatial model. Schools also use spatial models of plant or animal tissues. Recently also photographs made by a scanning microscope have become available which are very plastic. P.M. Dwyer was the first to introduce scanning microscope photography.

10.61

453. DZIEK, M.: Ein Modell zum besseren Verständnis des Bildsehens der Insekten mit der Koplexauge /Facettenauge/.
/A model for achieving a better understanding of the images seen by insects with their compound eyes /composed of many facets/./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 8, pp.237-245.
6 figs.

In the theoretical part of the article the author analyses the structure and compositien of 3 types of compound eyes in insects: superpositioned, positioned and neutrally superpositioned. All three types can easily be shown with the aid of a model which shows pupils how insects see. The author describes the structure and use of such models, which can help pupils understand that the image formed by a compound eye is not formed by partial images, but is composed of points of various light or colour. An apositional eye is found for instance in beetles active during the daytime, in hymenoptera and in libellula, while a superpositioned eye is found in insects active in twilight and in night insects, such as moths; flies have a neutrally apositioned eye. Small crustaceans have a small number of ommatidiums while the Drosophila fruit fly has 700, the domestic fly has 2000, the honey bee and cock-chafer around 6000, the butterfly Dilina tiliae 12000 and large libellula from 12000 to 28000.

10.51

454. FARDY, R.W.: Staining Bacteria by the "Half-a-gram" Method.

The American Bioloty Teacher, 42, 1980, No.3, p.179.

The use of the method cited in the title is relatively easy for an experienced person. The author, however, found that students who are beginners in microscopy, have difficulties in following the complex staining methods used. He therefore recommends dividing the process into several steps for beginners.

10.61

455. FRANYÓ, I.: A tüdő mozgatásának modellezése. /A model of lung movement./

A biológia tanitása, 19, 1980, No.2, pp.63-65.
3 figs.

The author presents a new model for demonstrating the movement of the lungs and the chest during respiration. He stresses the advantages of his model in comparison to Donders' model, especially the possibility of showing the movement of the ribs and the changes in the chest as an outcome of the functioning of intercostal muscles and the diaphragm. Precise instructions are given for making the model. In spite of the fact that the model has a number of deviations from reality, when it is correctly interpreted it is a very good aid in explaining respiration.

10.61

456. HAHN, M.: Eine Modellwirbelsäule für den Unterricht in der Orientierungsstufe. Bauanleitung und didaktisch-methodische Begründung. /A model of the spinal column for teaching in basic school - instructions for its making with didactical and methodological comments./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.1, pp.18-20.
4 figs., 1 tab.

The author provides instructions for the making of a model of the human spinal column, which makes it easier to demonstrate the normal position of the spine and also its faulty posture and faulty development. The model is discussed not only from the point of view of making it, but also its use in class, where it is much clearer than using an original object or a whole human skeleton. This teaching medium is also a good aid in teaching children correct body posture and thus the prevention of spinal disease. The model makes it possible to show the movement of the spinal column and to distinguish in various parts by different colours. Its helps to mentally and logically preceed from the specific to the general and to learn basic biological notions. In teaching, first the students should observe actual human spines /by touching their own spines/ and then pass on to the model and to slides. This makes it possible to understand the very complex biological processes which take place in the human body.

10.51
457. HAWK, J.A. - PIZZAIATO,T.D.: Demonstrating the Anatomical Expression of Two Genes in the Garden Pea.

The American Biology Teacher, 42, 1980, No.4, pp.238-239.
2 figs.

The authors describe a rapid staining method used for the study of the anatomy of genes in garden peas. These genes indicate the economic importance of the larger genes, the phenotypical expression of genes from an anatomical point of view and also pleiotropy /the multiple phenotypical expression of a single gene/. Besides this the study is interesting from a historical point of view because one of the genes was used by Mendel in his classical studies of heredity which were also done with the garden pea.

10.61.
458. HEFTER, I.: Darstellung der Chromosomenreduktion bei der Bildung von Keimzellen mit Hilfe eines halbdynamischen Folienmodells. /Demonstrating chromosome reduction in the process of the forming of embryonic cells with the aid of a semi-dynamic model made of foil./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.3, pp.81-83.
1 worksheets, 2 figs.

Understanding the reduction of chromosomes in the forming of embryonic cells is a problem which pupils have difficulty in achieving. The author for this reason suggests the use of a teaching aid in the form of a semi-dynamic model made of a cardboard pad, 4 paper frames, a covering foil and diploid numers of chromosomes made of two-coloured foil. With this model, pupils in independent assignment can learn to understand chromosome reduction. The model is designed for the 9th and 10th classes of secondary schools in the topic Heredity and sexual reproduction.

10.61

459. LAUG, A. - MATZAT, K.: Der Einsatz eines elektronischen Neuronenmodells im Unterricht. /The use of an electronic model of neurons used in teaching./

Der Biologieunterricht, 16, 1980, No.1, pp.77-104.
8 worksheets, 10 figs.

In the upper classes of general education secondary schools stress is placed on the most recent findings of science. This makes it possible to extend the knowledge of pupils in biology and thus better prepare them for higher education and acquaint them with scientific methods used by biology and the methods used to acquire new knowledge. The curriculum includes the foundations of neurophysiology, where basic terms and notions are learnt. For a practical study of problems associated with the physiology of neurons, the author suggests making a modern electronic model of the neuron, which makes it possible to study the rest potential of nerve cells and changes in potential in response to excitation of nerve cells, as well as neurone membranes , local and action potentials, excitation waves, the law of "all or nothing" and the coding of excitation force by changes in impuls frequency, etc. It also makes it possible to demonstrate the function of the synapses. The author provides a detailed description of the model, cites the material needed for its making and how it works. A drawing of the model is also provided.

10.61
460. LLEWELLYN, G.C.: Constructing a Dynamic Lung and Breathing Model.

The American Biology Teacher, 42, 1980, No.4, pp.240-242.
3 figs.

The author acquaints the reader with the construction of a simple apparatus, which can be used in school to demonstrate the function of the lungs on the basis of membrane pressure and the possibility of disturbing the sensitive equilibrium of this pressure by small wounds in the chest or wounds caused by piercing the chest. This is very instructive, especially as far as the prevention of mechanical accidents is concerned. The model can also be used for demonstrating the effects of air pollution caused by smoke and other harmful substances. The article also contains descriptions of other uses to which the apparatus can be put.

10.61
461. MATHIS, P.M.: The use of manipulative models in teaching mitosis and meiosis.

The American Biology Teacher, 41, 1979, No.9 pp.558-559.
4 figs.

The use of a three-dimensional model greatly facilitates the teaching of mitosis and meiosis. It can be used in individualized teaching, led by tape recorded instructions.The article contains a discussion of the teaching of basic cellular elements such as chromosomes, centromeres, the nucleus in its various stages and cytoplasms. Each topic contains an introduction and 4 problems which the student is assigned to solve on the basis of the model. The project was tested in two groups of students, where the control group worked without contact with the model. The findings were statisticially assessed with a t-test; a significant difference was found to exist in the knowledge skills attained by students, who were very interested in the outcome of the project.

10.61

462. MIRAM, W.: Modelle im Biologie-Unterricht./Models in biology teaching./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.8, pp.226-233.
6 figs.

Models are very extensively used in biology teaching, but they also exist in the every-day world. A dog considers a rag to be his prey, children's toys represent models of real objects. Thus modelling is not only a didactical problem, but a scientific one as well. In any case a model in fact assumes "play", without any danger attached to it. A model represents actually existing patterns, even if it itself has such characteristics only partially. In teaching, models are very important because the object being modelled becomes more comprehensible. However, the difference between the model and the original always remains evident. The pupils must have some knowledge of the original, otherwise they cannot consider some knowledge of the original, otherwise they cannot consider the model to be a substitute for the original. The author goes on to analyse the significance and function of models in the teaching of natural science subjects; he especially stresses the importance of functional models. In the article he also discusses in greater detail a model which demonstrates the functions of the nervous system, how nerve cells process information, the control of movement by the cerebellum and the cumulation of information in the nervous system.

10.61

463. POENICKE, H.W.: Ein Funktionsmodell zur Veranschaulichung des Bluttransportes in den Venen. /A functional model to show the transport of blood through the vessels./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.5, pp.121-131.
1 fig.

The model shows how vein blood is forced through the artery. Two rubber hoses filled with water /which represent a vein and an artery/ are pressed together by a collar. In the hose representing the artery a wave pusle forms, which presses the hose representing the vein down. The valve in the model allows the water in the "vein" hose to recede only in the direction of the heart. With each pulse wave in the artery a glass capillary attached to the vein spurts water. The author provides a precise description of the structure and functioning of the model.

10.61

464. QUASIGROCH, G.: Einig aussergewöhnliches Her-zmodell. /An exceptional model of the heart./

Praxis der Naturwissenschaften Biologie, 29, 1980, No.8, pp. 246-247.
2 figs.

The author provides information on building a model of the heart with functioning valves. It was built on the basis of the initiative provided by information from an American firm which makes artifical valves for the needs of cardiac surgery. The author describes the building of the model of a heart with functioning valves, which have been developed by the Edwards Laboratory in Santa Anna, California.

10.61
465. SILBERSTEIN, E.P.: Constructing a model of nerve cell transmission.

The Science Teacher, 48, 1981, No.1, pp.33-34.
1 figs.

The complex system by which electrical signals are transmitted through nerve cells are difficult for students to understand. The author has therefore attempted to construct a model with an independent electrical source. The model and its building are shown in a drawing and its use is described in detail. This simple and inexpensive apparatus can also be made in a school workshop, and can be used for experiments in all types of secondary schools.

10.61
466. SIEGER, M.: Die Anfertigung von Gips-Gebissmodellen für die Zahngesundheitserziehung im Biologieunterricht.
/Making a plaster-of-paris model of dentitions for health education./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.7, pp.218-221.
1 fig.

The author points to the possibility of using plaster-of-paris models of dentitions made by dentistry technicians when making dentures, for the teaching of human biology. The models of dentition are made by using casting moulds made by dentists; as many models as are needed can be made quite inexpensively. The author describes in detail the material needed, how the models should be cast and their use in teaching lessons.

10.71

467. LIEB, S.: Möglichkeiten und Grenzen des Einsatzes von ethologischen Filmen im Biologieunterricht. /Opportunities for and limits to the use of ethological films in biology teaching./

Der Biologieunterricht, 16, 1980, No.4, pp.34-57.
4 worksheets, 3 tabs.

The author points to the usefullness and didactical advantages of using films on ethology in biology teaching. He first devotes attention to descriptive ethology /or the morphology of behaviour/, which forms the basis for achieving an understanding of modern ethology in its whole broad scope and for understanding the so-called ethogram of each animal /a sum of all behavioural elements/. Ethological films have a dual purpose in biology teaching - on the one hand they provide specialized knowledge and on the other hand they are didactically very useful in class. Ethological films also bring with them specific problems; for instance special, effect films can condense the course of behavioural patterns and their consequences, which can lead to a misunderstanding of the whole behaviour in question. The author assesses several specific films on ethology dealing with the behaviour of the three-spined stickleback, which has become a classical object of ethological studies /cf. Tinnbergen, who recieved the Nobel Prize/. On the basis of this example the article highlights the problems connected with didactical reductions. The second, more detailed film discussed, deals with the ethology /and especially the mating behaviour/ of the albatros Diomedea irrorata. The article also contains worksheets, which the pupils should recieve as assignements after having seen ethological films.

10.71
468. Neues aus dem FWU /Filme/. /New items form FWU films./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.2, pp.58-62.
4 figs.

In the Federal Republic, the FWU has produced three new films concerning the roebuck and its environment, copulation and the development of the doe. Hence all three films are devoted to a single animal, but each from a different angle, so that all three films serve very well for teaching purposes. They are especially valuable for a study of ethology. Teachers and pupils do not have the opportunity of observing, during excursions outdoors, the behaviour of wild animals for any period of time. Many interesting aspects concerning the life and behaviour of animals can be shown to pupils in schools only through films. The films are intended for secondary school pupils. An interesting item is an actogram of a roebuck's daily activities on its own territory during the course of the whole year. Also a picture of the roebuck's pasture land and the territory it uses for copulation are shown in the film and from this basis,ethological notions can be derived and pupils can learn about population regulation among roebucks.

10.71
469. HOBLE, W.C. - HOLT, G. - STRACKEY, L.M.: Comparison of the efficacy of slide /tape and cine-loop as teaching aids for microbiological techniques.

Journal of Medical Education, 13, 1979, No.3, pp. 204-206.
1 tab.

The article reports on the findings of a research project which aimed at determining the efficacy of slides used in combination with tape recordings and cine-loops in teaching simple manipulative skills in microbiology. The project concerned a group of students in their first year of study. According to the findings there is no essential difference between both media. The data obtained was assessed by a t-test. It was, however, found that those students whose first language is not English are at a disadvantage. In the concluding part of the article the authors comment on these aspects of the problem.

10.71
470. RUPPOLT, W.: Filmnachbereitungen. /Preparations for using a film./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 12, pp.368-373.

The author bases his discussion on the use of films on the opinions of the educator Siedentop and his textbook on the methodology and didactics of biology teaching. He stresses the significance of films, especially in teaching biology. In this case films do not serve the purpose of recreation, but for extending some part of the syllabus and also as motivation for learning some new topic. The author comments on the need to prepare for the showing of a film and how to make sure that maximum use from an educational point of view is made of showing the film in class. Specific examples of films are cited and how they can best be made use of from a didactical point of view.

10.72

471. BONATZ, H.H.: Zur didaktischen Bedeutung evolutionsbiologischer Objekte in der gegenwärtigen Bildungssituation.
/Concerning the didactical importance of evolutionary biological objects in the present educational situation./

Naturwissenschaften im Unterricht-Biologie, 28, 1980,
No.6, pp.171-175.
6 figs., 1 press clipping.

Teaching evolution in the biology course is very important for achieving an understanding of the world and biology as a science. Some biological objects provide a suitable opportunity for acquainting pupils with evolution. The author cites the very interesting programs prepared by educational radio, concerning the finding of a mammoth near Berezovka in the USSR. The program which the author mentions was made by and bought from the G.D.R. It describes an expedition to look for mammoths in Berezovka. The mammoth is an excellent example for achieving an understanding of evolution and its laws. Pupils are usually very intersted in this exctinct ancestor of the elephant. Besides extinct large reptiles it is the best known of extinct animals and in contrast to huge reptiles, the mammouth has a direct bearing on the evolution of man and makes it possible to demonstrate how animals adapt to changes in the conditions of their life. The author provides a survey of this radio program: The mammouth from Berezovka was trapped in the permafrost 39 000 years ago, and was found by a reindeer hunter called Tarabykin in the year 1900. The discovery was announced to the authorities by the Cossack Yavlovski and the Academy of Sciences in Petrograd sent an expedition to study the mammoth, lead by the zoologist Herts and the taxidermist Pfizenmayer. In 1901 the mammoth was transported 6000 kilometers to the city of Irkutsk and then in the course of two weeks by rail to Petrograd. The program describes the mammoth and the people who hunted him.

10.72

472. HARMANN, U.: Schulfernsehen und Schulfunk im Schuljahr 1980/81. /School TV and school radio in the course of the academic year 1980 /81./

Biologie in der Schule, 29, 1980, No.9, pp.389-393.
2 tabs.

Listening to various TV and radio programs should be planned in advance, including their use in hobby clubs and extra-curricula activities. Individual programs are summed up in tables. 8 TV programs for the 10th class, 3 TV programs for the 9th class are planned. Radio programs will concern 4 groups of topics, which are enumerated in detail.

10.72

473. HARTMANN, U.: Schulfunk zur Sendelinie "Wissenschaft als Produktionskraft"./School broadcasting on the topic "Science as a Productive Force"./

Biologie in der Schule, 29, 1980, No.5, pp.216-220.

The author acquaints the reader with the concept of various radio programs, the dates of their broadcast, duration and how they relate to the teaching syllabus concerning topics "Success achieved in the cultivation of new wheat strains" /30 minutes/ and "Disease of club fungi" /30 minutes/.

10.72

474. KONNICKE, M.: Über die didaktische Funktion von Unterrichtssendungen des Fernsehens. /Concerning the didactical role and function of educational TV./

Biologie in der Schule, 29, 1980, No.1, pp.33-35.

The first educational programs shown on TV were related to teaching in the 10th class and began in September 1976. Since then practical experience has indicated that TV programs either replace or reinforce the following didactical functions: the introduction of new material, mediating teaching material, developing already previously taught material - for instance combining various items of knowledge -discovering relations to practice, extending knowledge adquired earlier and achieving a systematic approach to the given topic. As a teaching medium, a TV program can fulfil the following generalized functions: the mediation of information and knowledge, explaining the application of science and technology practically, supervision of the cognitive process, providing motivation for cognitive interests, verification of what has been learnt and skills gained and a rationalisation of the teaching process. The author in conclusion discusses the program called "From Generation to Generation".

10.72
475. LAFOND, M.C.: Expérience d`introduction de` informatique dans l`enseignement secondaire. /Experiences with introducing pictatorial information into teaching in secondary school./

Biologie-Géologie, 67, 1980, No.1, pp.85-90.

Prof. Lafond assesses, after a period of 10 years, the experiences which have been gained by biology teachers in introducing pictatorial information into teaching. He first describes the testing of this method and the apparatus used for showing the material. He goes on to assess the work of various information centres, programs provided by them and their lending services. He comes to the conclusion that this teaching method has brought positive results and should be extended in the future.

10.73
476. HEINZEL, I.: Zu "Arbeit mit Orientierungshilfen für geistige Tätigkeiten" im Biologie in der Schule 7/8 1979. /Concerning the article "Orientation Aids for Mental Activities", published in Biologie in der Schule 7/9, 1979./

Biologie in der Schule, 29, 1980, No.11, pp.29-30. 2 figs.

The author discusses the article cited in the title and adds recommendations for introducing other orientation aids, such as drawings, which make it possible to better internalize the structure of an activity and to learn more efficiently. She especially concentrates on definitions and explanations /i.e. finding the causes of phenomena/.

10.73
477. KENKEL, L.A.: Teaching mitosis with playing cards.

The Science Teacher, 47, 1980, No.6, pp.40-41.
13 figs.

Mitosis and the reduction division of maternal pollen cells can be taught with the aid of playing cards; the author describes an interesting game which explains these biological processes to pupils. The activity of chromosomes during mitosis and their function during meiosis are explained by sets of playing cards on five panels, shown in the article; each set of cards is explained.

10.73
478. BATIY, Y.Y.: Izpolzovaniye kartin na urokakh botaniky.

/The use of pictures in botany lessons./
Biologiya v shkole, 54, 1980, p.47, No.1.

The author recommends the use of pictures hung on the wall not only for the purpose of teaching new material, but also for the purpose of verifying what the pupils have learnt. For this purpose the author cites various types of pictures, including those of partial objects /for instance a picture of various types of fruits and seeds which are designated by large numbers, so that the picture can be used in giving the pupils written tests, also concerning other subject-matter, for instance flowers.

10.731

479. KOVALEVA, V.V.: *Dinamicheskiye skhemi na osnove flanelegrafa.* /Dynamic outlines on the principle of a flannel board./

Biologiya v shkole, 54, 1980, No.5, p.44.

The author describes the advantages of gradually forming a picture on a flannel board /a flannelograph/ and how it should be used. A piece of flannel is streched over a board and drawings backed by fine sandpaper or pasted on velvet paper will adhere to the flannel, making it possible for the teacher to gradually compose various previously prepared elements as the lesson is being taught. The author points out that with increased humidity the adherence of the flannel decreases, while with increasing temperatures it increases.

10.733

480. FRATCZAK, J.: *Technika wykonywania projektogramów foliowych.* /The technique used for making transparent projectograms out of foil./

Biologia w szkole, 33, 1980, No.5, pp.286-291. 7 figs.

The author uses the term projectogram for what is otherwise called a foliogram /transparencies/ and the term projectoscope for what is otherwise called an overhead projector or foliogram projector. Foliograms are made either commercially, or teachers make them themselves. The author describes various techniques for making them in school, such as using wax crayons /which can later be removed/, special ink /dissolved in gasoline to make it easier to use/; when glycerol is added to the special ink it has greater stability. An ink drawing can also be sprayed with a special coating to make it more permanent. The author also discusses the use of special paints. He recommends the squares method for transferring a picture to the foil and the use of spray paints for solid areas. Also drawings can be scratched into solid areas of colour or other pictures can be glued on to the foil. An interesting method of presentation are phasegrams, in which individual stages of a biological process either supercede or follow each other.

10.733
481. PAPROTTÈ, M.: Selbstfertigte Medien für den Biologieunterricht, dargestellt an Arbeitstransparenten.
/Independently made biology teaching media demonstrated on transparencies./

Der Biologieunterricht, 16,1980, No.4, pp.88-101.
1 fig.

The author first defines teaching media which she thinks should include media both for teaching and for learning, with have a definite didactical function and which facilitate the learning process. They also lead to greater effectiveness of teaching and mediate information in the process of teaching and education. Teaching media have various functions, and they should have their proper place in biology teaching. Biology teaching media are either related to the activities of the teacher, to planning and carrying out teaching or to the activities of the pupils, i.e. learning. Both functions are intermingled and overlap, and they closely depend one on the other. In view of their great variability they tend to influence the dynamics of the teaching process in a positive manner; they also positively influence the relation between the pupil and the teacher. Modern teaching media in biology especially concentrate on the work of the pupil. Each teaching medium should have a specific place in teaching in order to assure that working with it is efficient to a maximum degree. Teaching media should be used in the introductory, explenatory, excercising, repetition and verification stages of teaching. The author then deals with the special function of transparencies in biology teaching.She describes their didactical utilization, how the teacher can make them himself and how they should be utilized in teaching.

10.74
482. BROVEY, D.L.: Giving science your best shot.
The Science Teacher, 47, 1980, No.3, pp.25-27.
4 figs.

Teaching the natural sciences requires the use of pictures - therefore both teachers and pupils should take photographs. Photographing natural objects is a form of teaching, where the students can actively participate. The author provides various advice about how to photograph in six brief lessons with various tips on how to succeed.

10.74
483. THEUERKAUF, H.: Mikrofotos für den Biologieunterricht.
/Micro-photographs for biology teaching./

Biologie in der Schule, 29, 1980, No.7/8, pp.345-346.
8 tabs., photography appendix.

All textbooks for biology from the 6th class onward include microphotographs. They are supposed to help students to better understand and correctly interpret what they see under the microscope. Txtbooks usually include only a single picture of a typical object. It is however, better to show a larger number of pictures. The topic "The Structure and Metabolism of the Higher Plants", taught in the 9th class, can be improved if micro-photographs of permanently mounted specimens are shown. The author describes his use of them during microscopy periods, and when the subject-matter is being repeated and tested. Several technical comments are offered concerning the making of microphotographs.

10.74
484. WEISS, W.: Fotografieren in biologische Arbeitsgemeinschaften.
/Photography in a biology hobby club./

Biologie in der Schule, 29, 1980, No.10, pp.436-441.
7 figs.

It is often very difficult to determine natural objects which pupils see and observe during excursions. Photography can serve as an aid in this context. The author describes how his pupils took photographs of trees, how photograms were made where pressed leaves are placed between two glass plates and photographic paper and then are illuminated /the exposition period must be arrived at by a trial and error method/. Attention is also paid to the photographic reproduction of drawings and the making of photographs to determine birds in flight. In conclusion, photomaterial and chemicals for making prints are discussed.

10.75

485. KRONFELDNER, M.: Die Verwendung von Objektdias im Unterricht beim Thema "Verbreitung von Samen und Früchten". /The use of slides of various objects in teaching the topic "The Distribution of Seeds and Fruits"./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.8, pp.248-249.

The author provides information on a simple method of making slides of objects related to the topic of seeds and fruits. Small seeds and fruits with clear contours, such as the winged seeds of coniferous trees, or fruits which become embedded in the soil, can be placed between two slide glasses and placed in a slide frame. In projection we obtain very sharp outlines and the pupils can then describe the structure of the seed or fruit and how it is adapted to dissemination by the wind, by animals or by man. The author provides a list of suitable plants, whose seeds or fruits can be used to make this type of slide, which projects the original artefact.

10.75

486. SCHMIDT, H.: Medien. Neues aus dem FWU: Materialen zur Evolution III. /Teaching media: New items from FWU: Materials concerning Evolution - III./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.7, pp.220-221.
1 fig.

FWU has produced 5 new slide series, which all concern animal fossils. They concern the development of life, the development of invertebrates, the evolution of fish and amphibians, reptiles and mammals. The slides can serve as teaching aids on evolution and can serve as a substitute for lacking palaeontological material, which is very expensive. The slides concern important types of fossiles, representatives of various geological periods, so-called missing links in development, etc. The slides can also be used in teaching geology, topics concerning the rise and development of life on Earth, the transition in vertebrates from an aquatic to a terrestial environment, transitional forms, mosaic forms, the Watson rule, adaptive radiation, homology, convergence and development of species unable to adapt to changed conditions which become extinct.

10.76

487. MATRAY, P. - KNORR, S.: Bio /art/: a team teaching approach for secondary schools.

The American Biology Teacher, 42, 1980, No.8, pp.477-481.
5 figs.

No matter how strange it sounds to combine biology and art teaching, a biology teacher and an art teacher have prepared a special course, which has already been tested, where they teach how to use drawing methods in biology; this skill is taught for further use, especially at an institution of higher learning. In the introduction, the work of outstanding artists is mentioned /for instance Albrecht Dürer/, as well as the contribution made by photographs of flora and fauna. The article discusses the contribution made to the course by the biology teacher and by the art teacher. Several drawings of birds and plants made by students are also shown.

10.76
488. SEHMRAU, W.: Zur Beschriftung von Skizzen. Zeichnungen Abbildungen und Stempelm. /On how to describe sketches, drawings, pictures and rubber-stamps./

Biologie in der Schule, 29, 1980, No.2/3, pp.74-76. 1 fig.

The article is a rejoinder to an article written by Horn called "Methodological aids concerning the syllabus on the development of seed plants". The author criticizes especially the quality of the drawings and offers her own suggestions for drawings with descriptions. This concerns drawings of a kidney bean seed and a maize spike.

10.77
489. JOHNSON, H.: The British library of wildlife sounds.

Journal of Biological Education, 14, 1980, No.1, p.92.

The British Library of Wildlife Sounds has been founded over 10 years ago as part of the National

Archives of Sounds and the British Institute of Recorded Sounds. It has a collection of over 25 thousand various recordings of the sounds made by all kinds of animals - the majority of which are birds, but also large numbers of mammals, insects, amphibians, reptiles and fish. The recordings are available either on records or tape. The collection of commercial recordings is probably the largest in the world. It holds the majority of the thousands of sounds of wildlife which have been published in various countries of the world. Recordings will be sent on request at very low prices, which cover the price of the recording service, packaging and postage.

10.77

490. NIKOLSKIY, I.D.: Gramplastinki "Golosa zhivotnikh" dlya sredney shkoli. /Phonograph records "The Voices of Animals" for secondary schools./

Biologiya v shkole, 54, 1980, No.1 ,p.73.

The article provides information on the publication of four phonograph records called: The Sound of Bird Communication, The Sound of Rare Animals, The Sounds of Amphibians and The Sound and Bielectrical Signals Produced by Fish. They were all published by Melodiya and aim at use in zoology teaching in the 7th class.

10.79

491. ERDTMANN, J.: Einige Hinweise zum Stempel "Photosynthese". /Some comments on rubber-stamps for the topic Photosynthesis./

Biologie in der Schule, 29, 1980, No.5, pp.196-197. 2 figs.

A rubber stamp called Photosynthesis makes it possible to show or possibly also to test in class the most important factors and biochemical components of photosynthesis. This has advantages in the objective assessment of pupils. Filling in the empty places in the rubber stamp also brings with it some problems - for this reason the author submits his own version of such a rubber stamp. It deals with the light stage of photosynthesis, the relation between light and darkness reactions and the darkness stage of photosynthesis.

10.80
492. DAVIDSON, D. - HOF, D.: Plotting moonrise and set times.

The Science Teacher, 47, 1980, No.3, pp.34-35.

Knowledge of the moon's movement belongs to basic science knowledge. The authors demonstrate how students can plot these movements in a diagram. The basic data is available in astronomy handbooks, but diagrams are much clearer than rows of numbers.

10.83
493. Biológia III. kísérleti tankönyv tanítasi tapasztalatainak összegzése. /A summing up of experience gained in teaching according to the textbook Biology III./

A biológia tanítása, 19, 1980, No.4, pp.97-104.

The article sums up the experiences of 11 teachers of secondary schools, which have been published in previous issues of this journal /1980, 1, 2, 3/. Various passages of the textbook are explained. Tests based on the textbook , which have been given on a national basis, are assessed. On the whole the new textbook is assessed very positively. It is rather demanding and contains probably a maximum of what a secondary school can teach. It is also in accord with the demands made by modern biology, psychology and other sciences which have a bearing on teaching and education in the broadest sense of the word.

10.83
494. AHLGREN, A. - NELSON, J.A.: Neglect of biological rhythms in high school biology texts.

The American Biology Teacher, 41, 1979, No.6, pp. 344-346.
1 fig.

The basis for achieving and understanding of life processes is some knowledge of the rhythms which are repeated in various biological process at various levels. However, it is necessary to distinguish between a scientific study of biological rhythms and pop "biorhythms" based on the date of birth of the subject. The authors discuss some fundamental rhythms which can be observed in physiological processes. The first concerns fluctuations in the body temeprature of humans. Another is the very important concept of homeostasis. Both these biological rhythms are discussed in the context of their treatment in some biology textbooks. In further parts of the article the authors deal with the problem of the extent to which biology textbooks for secondary schools devote attention to this problem and other problems connected with it, such as control of stimuli from the environment, a simplification of internal mechanisms, anomalies in rhythm, etc. In conclusion the authors stress that of the five textbooks they have examined, in all of them this subject was dealt with inadequately.

10.83
495. ÁRENDÁS, V. - BERCZELÉDI, T. - TAKÁCS, A.: A Biológia IV. tankönyv tanításának tapasztalatai. /Experiences with teaching according to the textbook Biology IV./

A biológia tanítása, 19, 1980, No.6, pp.161-167.

Three secondary school teachers here write about their own experience with a new experimental textbook called Biology IV. Its linking to material in the textbook Biology III is very good and also its interdisciplinary approach is positive; it uses knowledge from chemistry and physics. The textbook is assessed from various points of view, such as its time schedule and the structuralization of its material, the quality of its process of forming notions, the amount of numerical data it includes, its accessibility, its activating effect on pupils, etc. Methodological problems of teaching according to the textbook are also discussed, as well as the use of other media together with the textbook. In conclusion the authors express the opinion that this new textbook is a success and makes available to pupils improved biological thinking, when compared to the textbooks in use until now.

10.83
496. ASRIEL, P.: Zum aktuellen Thema. /Concerning a current problem./

Biologie in der Schule, 29, 1980, No.12, pp.523-524.

A methodological handbook now being prepared for use with the biology textbook in the 8th class promises to be very successful. The suggestions for individual lessons provide the teacher with the opportunity for creative work; stress is place upon conversations and discussions. However, the author also points to some weak points and problems which have appeared.

10.83

497. BECKER, H.: *Zum aktuellen Thema.* /Concerning a current problem./

Biologie in der Schule, 29, 1980, No.12, pp.524-525.

The author assesses, in a generally positive manner, the textbook for the 8th class which is now being prepared, as well as the methodological handbook which is also being drawn up to accompany the textbook. Especially the increase of motivation is considered to be very positive for improving the effectiveness of teaching. The topic "Respiration" is analysed in greater detail and positive, as well as some negative aspects are cited.

10.83

498. BEHNKE, K.: *Zum aktuellen Thema.* /Concerning a current problem./

Biologie in der Schule, 29, 1980, No.11, pp.476-478.

The author expresses his satisfaction with a new biology textbook and methodological handbook for the 8th class. He especially praises the manner in which photographs have been put into the book, as well as various diagrams, assignments, current problems and the various other uses to which the textbook can be put, including elements of civilian defense. He also, however, offers several critical remarks, for instance concerning the use of regional elements and the need to improve the quality of the text in some sections.

10.83
499. Der Mensch. /Man./

Biologie in der Schule, 29, 1980, No.7/8, pp.277-294. 22 figs.

The article provides a specific example of the method used in a new revised edition of a biology textbook for the 8th class, and concentrates on topic 2.4: "Respiration". First the status of man in nature is discussed and his difference from other animals; the fact that he is made of cell tissues and organs is stressed. The main part of the topic concerning respiration begins with an explanation of the essence of respiration and the structure of breathing organs. It then continues with a chemical explanation of respiration and concludes with a passage on the hygiene of respiratory organs.

10.83
500. DORBER, H.: Konzentration auf das wesentlichen Darstellung an zwei Texten des Biologielehrbuches für Klasse 6. /A concentration on the essential - on the basis of the example of two texts from biology textbooks for the 6th class./

Biologie in der Schule, 29, 1980, No.5, pp.188-191.

To concentrate on the essential is decisive for the successful implementation of learning, as has been stressed by the VIIIth Pedagogical Congress. This concentration has two aspects: one concerns the content of the subject-matter, the second various didactical measures aimed at carrying out instruction. This article deals with both these aspects, but the main stress is placed on the former, for which the quality of the textbook is of great importance. The author first cites some of the characteristic traits of the textbook for the 6th class, where for instance in his opinipn the description of the life and behaviour of animals is redundant, as is a description of various nature conservation measures. The author discusses which sections of the text both teachers and pupils consider to be essential, as well as the extent to which the syntactic structure of the text influences stressing the essential. The author concentrates on two sections, one dealing with the conservation of the forest and the other with the importance of the honey bee. On these two samples the author analyses to what extent the essential includes various relations, etc.

10.84
501. ENDRÉDY, L.: Differenciált biológiatanítás: "Mastery Learning" és programozás egy oktatástechnikai eszközrendszer alkalmazásával. /The differentiated teaching of biology: "Mastery Learning" and programming with the use of a single system of technical teaching media./

A biológia tanítása, **19**, 1980, No.6, pp.168-173.
2 figs.

The author discusses the possibility of using programmed teaching within the framework of biology. He first describes the historical development of programmed teaching and then some of the experiences gained in experiments in this area in general education secondary school. The subject and aim: of an experiment are cited, as well as the system of assessment of the experiment, used, how the teaching material was organised and the methodology of the experiment. The article also contains an extensive bibliography on the subject of current Hungarian and foreign literature on the subject.

10.83
502. KENNEDY, K.: Determining the Reading Level of Biology Textbooks.

The American Biology Teacher, 41, 1979, No.5, pp. 301-303.
1 fig., 2 tabs.

Teachers often are asked to select a textbook which they consider best suited for their purposes. This concerns not only the content of the textbook, but also the reading level required of the reader to understand the textbook. Essentially two factors should be taken into account: the lenght of sentences and the number of letters in words. On this basis it is possible to draw up a Fry graph of reading level, where the ratio between the average number of short words and long sentences per 100 is calculated and plotted on the vertical axis, while the horizontal axis represents the average number of letters per 100 words. The curve which is thus plotted yields the reading level of the text. The article cites a specific example on the basis of "Biological Sciences: An Ecological Approach", which is then compared with similar data for 15 other high school biology textbooks available.

10.83

503.KISS, L. - OBERCZIÁN, G. - BERCZELÉDI, T.: A Biológia II. tanításának tapasztalatai. /Experiences with teaching according to the textbook Biology III./ A biológia tanítása, 19, 1980, No.2, pp.33-42.

The authors, who are secondary school teachers, write about various positive and negative aspects of the cited textbook. Most of their opinions are in agreement with each other. All of them for instance cite a lack of time / 4 hours weekly / for teaching the whole content of the book and insufficient time devoted to repetitions, summaries, excercises and experiments. They also agree that there are too many tests, even if they are well done. The method of structuralizing the subject-matter is praised - it adhers to the method of organisation ofl living organisms. The authors also discuss the process of forming notions, the sequence of topics /which one of the authors would like to see changed and suggests a different sequence/. The pupils, it was found, like the approach used by the textbook, which provides positive motivation to learning. The authors also come to the conclusion that in spite of the negative aspects of the textbook which have been mentioned, that this is finally a textbook which is in accord with the given state of biology as a science and the didactics of biology.

10.83
504. KOZIATEK, L.: Programowanie w nauczaniu przyrody w kl. V. /Programming nature teaching in the 5th class./

Biologia w szkole, 33, 1980, No.2, pp.110-113.
1 fig., 4 tabs.

At the 2nd National Polish Seminar on the Didactics of Biology participants were acquainted with the preparation of a new textbook on biology by B. Hoszewska, based on programmed teaching, which is now being tested in Polish schools. The author cites an example on the basis of the topic "Fruit Orchards in Poland and the Importance of Fruit". The aim of the program is to acquaint pupils with the development of the cultivation of fruit trees in Poland and its plans for the future. The importance of fruit from the point of view of nutrition and the economy are discussed, as well as the fruit processing industry. One of the advantages of programmed teaching is that pupils can chose their own speed of learning, they become more active and independent in their work, they excercise more self-control and become more critical of their knowledge, skills and learning. They also learn to concentrate in silance on their individual task.

10.83
505. KRESSE,M.: Zum aktuellen Thema. /Concerning a current problem./

Biologie in der Schule, 29, 1980, No.10, pp.434-436.

The author here reacts to information concerning a new textbook which is being prepared on biology for the 8th class. He comments on the problem of essential subject-matter in the context of the topic "Man and his Place in Nature". He also discusses the problem of pupil activity and motivation and points to negative aspects which, in his opinion, are found in the sample chapters of the new textbook published in the journal.

10.83
506. KRÜGER, L. - REINKE, C.: Zum aktuelle Thema. /Concernig a current problem./

Biologie in der Schule, 29, 1980, No.12, pp.521-523.

The authors express their opinion on the textbook and methodological handbook on biology for the 8th class which are now being prepared. They say that the text has very few redundancies, is informative, comprehensible and easy to survey. The examples cited have a motivational effect and are relevant to actual situations. The assignments provided, as well as summaries are very valuable. Also the pictures in the text are assessed positively and the educational potential of the subject-matter. Some suggestions for improving the text are cited.

10.83

507. KUMMER, G.: *Wie wird Wissen auch im Biologieunterricht Wissen für Leben ?* /How can the knowledge gained in biology teaching become knowledge which serves life ?/ Biologie in der Schule, 29, 1980, No.7/8, pp.273-276.

Such questions as how to provide pupils with basic knowledge and skills, how to improve the abilities of pupils, especially in experiments and observations, how to include into classwork various media, especially natural artefacts, how to influence pupils in a rational and emotional manner - all these are question which are of interest to all teachers. A discussion should concentrate on these problems - which the author specifies in three points. In the mean time a new textbook and methodological manual are being prepared for biology teaching in the 8th class and will be published on September 1st, 1981. The methodological approach and concept of the books are briefly outlined; parts of the textbook and manual will be published on a preliminary basis in order to provide material for discussion.

10.83

508. KUMMER, G. - ZABEL, E.: Lehrbuch und Unterrichtshilfen Klasse 9 zum 1. 9. 1980 neu ! /The new textbook and methodological handbook for the 9th class will be available in September 1980!/

Biologie in der Schuel, 29, No.7/8, pp.334-339.

A new revised edition of the textbook and methodological manual are being published in spite of the fact that no change in the curriculum and syllabus has taken place. The changes introduced are the outcome of experience gained during the last decade in working with the textbook. Non-essential terms and notions are being deleted, while other terms are being defined more precisely, and essential facts are more clearly stressed. The authors also characterize other various aspects of the new textbook. The use of 4 colours makes it possible to make the text more ostensive. Every paragraph of the textbook begins with the motivational aspects of the problem, with a photograph and a general introduction. Some of the more complex processes are described only in outline and in relation to their functional structure. In the second part of the article the concept of the methodological handbook is discussed.

10.83

509. KWIATKOWSKA-KOWAL, B.: Wpływ układu informacji w podręczniku biologii na strukturę wiedzy ucziników. /The influence of the information system in the biology textbook upon the structure of pupils´ knowledge./

Biologia w szkole, 33 , 1980, No.2, pp.79-83. 1 tab.

The author discusses the significance of the biology textbook for the structure of pupils knowledge. A textbook is a fundamental learning medium for pupils. It provides information, topics for study, assists in the self-education of pupils and in the verification of what they have learnt, it integrates what has been learnt and educates. The various functions which a textbook fulfills depend upon its content, the system according to which the material has been organized and the structure and methodological approach used. There are two basic groups of elements in a textbook: the text and methodological elements. Illustrations form a part of the basic vocabulary used by textbooks - they serve to provide support to the text, as do the descriptions of the illustrations and information and facts on biological phenomena and natural objects. The author carries out an analysis of the textbook now in use on the basis of the example of the topic "The System of Fauna", which is presented in a hierarchical and pyramidal structure. Two possible approaches are stressed - a logical one and the method of induction and deduction . In 1977 the textbook in question was tested in 11 6th classes of 4 schools in Warsaw. 328 pupils participated in the study. The pupils were given 25 different assignments on the basis of the textbook, which included basic facts and notions concerning protozoa and Coelenterata. Also laboratory excercises were done as part of the study. The outcome of the study is summed up in tables. The best results were achieved with induction methods. Pupils from basic schools have too little experience with deduction, but they should recieve training in this method.

10.83

510. PALKA, L. - SZYMANDERSKA, W.: Badania wdrożeniowe podręcznika dla klassy IV. /A study of an experimental textbook for the 4th class./

Biologia w szkole, 33, 1980, No.4, pp.223-228.
1 tab.

A project to investigate the introduction and use of a new school syllabus for biology and hygiene in the 4th class also includes the study of an experimental textbook whose author is K. Stępczak: Biologia dla klassy IV. This textbook was experimentally introduced in 19 schools in 6 different districts. The aim of the project reported on was to determine how suitable the textbook is from the point of view of the pupil, how it implements the aims and objectives formulated by the new syllabus and what necessary changes or additions are needed before it is definitely introduced into teaching. The selection of subject-matter and how it is presented were also the subject of assessment, as well as how comprehensive the textbook is and how well pupils are able to work with it. Also the book's graphics and lay-out, illustrations and how its fulfills its purpose as a source of information, study, motivation and control, as well as its educational and teaching functions in accord with the syllabus were assessed. Teachers from experimental schools, school superintendents and specialists in pedagogics participated in the project. Also such problems as how the textbook is used by pupils were examined, how pupils understand a specific section of the textbook and how they are able to interpret it, how the illustrations, diagrams and tables are made use of together with the assignments, questions and tasks provided. The project will continue.

10.83
511. PETERKA, [illegible]. - POROS, A. - STOJANOVITS, J.: A Biológia III. tankönyv tanításának tapasztalatai. /Experiences with teaching with the textbook Biology III./
A biológia tanítása, 19, 1980, No.1, pp.4-13.

Information on experiences gained in teaching with a new experimental textbook, which concentrates especially on open and as yet unsolved problems. One of the authors stresses that while it is true that the textbook is linked to the knowledge gained by the pupils in basic school, there is a two year pause in biology teaching and the pupils tend to forget a great deal of what they had learnt. In some cases there are difficulties with interdisciplinary relations. Some parts of the textbook are too extensive for the time available for the given topic. The basic method of presentation, which is based on the type of organisation of the organisms described, is considered to be positive. The uses of slide series and overhead projectors are recommended. The second author describes some of the drawbacks in the use of the experiments and excercises recommended by the textbook and also points out some errors made in the forming of notions /she recommends decreasing the number of notions used by 20-30%/. Some of the illustrations are too complicated. The third author concentrates on a statistical analysis of the textbook. She demonstrates that it is impossible to adhers to the time plan provided; there is too much material in the textbook. All three authors stress that specific improvements in the textbook will overcome the negative aspects of the textbook and produce an excellent teaching aid.

10.83

512. PETERKA, G. - STOJANOVITS, J.: A Biológia IV. tankönyv tanításának tapasztalatai. /Experiences with teaching according to the textbook Biology IV./

A biológia tanítása, 19, 1980, No.5, pp.161-167.

The authors who had earlier assessed the textbook for biology teaching in the IIIrd class, here sum up their opinions on an experimental textbook for the IVth class .Their opinions are more or less in agreement with each other: in comparison to the textbook for the IIIrd class, they found that here they had sufficient time for all the topics in the book. They suggest exchanging some of the topics in this book with those in the IIIrd class. The new part of the book concerning ecology is considered to be excellent because of its timely nature and comprehensiveness. The section on genetics, which is demanding from the point of view of thinking, contains some small errors which the authors cite. They also discuss the media and teaching aids used to accompany the textbook. The best section of the textbook concerns the evolution of man. Both authors express their satisfaction with the textbook, if the problems cited above are overcome.

10.83

513. REID, J.- MILLER, G.J.: Pupils' perception of biological pictures and its implications for readability studies of biological textbooks.

Journal of Biological Education, 14, 1980, No.1, pp. 59-69.
8 figs.

It is often claimed that "readable" texts are better perceived than texts endowed with an extensive vocabulary, where the very perception of the text places specific demands upon the student. This is also true of black and white pictures whose monotony cannot attract the attention of students as illustrations in colour do. The study indicates that the use of colours stimulates observation, but under specific conditions can also be distracting. The study indicates how to bring into accord the use of colour illustrations and the perception of students. The diagrams and figures illustrate the authors' findings.

10.83

514. SEIFERT, B.: Zum aktuellen Thema. /Concerning a current problem./

Biologie in der Schule, 29, 1980, No.11, pp. 478-479.

The author discusses the concept of a new textbook for biology teaching in the 8th class, and specifically its sections on respiration and the metabolism of the cell. The concept of the textbook is very good, since it activates pupils and is educationally very rewarding. The notion of osmosis should be introduced in a different manner. Also the section which describes the negative consequences of smoking should be extended and an experiment showing the negative impact of tobacco smoke should be included.

10.83
515. SCHILDE, U.: Nutzung guter Erfahrungen für den Fachunterricht. /The use of positive experiences in specialized teaching./

Biologie in der Schule, 29, 1980, No.6, pp.257-258.

A young beginning teacher here discusses the opportunities provided by in-service training for improving her work. She describes the use of methodological handbooks which are available and the work of the so-called Study Centre of Positive Experiences in Bautzen, where she is able to borrow recordings of school broadcasts and other teaching media. She also describes in detail the use of their collection of assignments, journals and pedagogical readings.

10.83
516. SCHUBERT, F.: Zum aktuellen Thema. /Concerning a current problem./

Biologie in der Schule, 29, 1980, No.11, pp.480-482.

The new textbook for the 8th class concentrates on essential problems, is more in accord with the syllabus and has very good graphics. It is modern in outlook and includes a well done section on hygiene. However, some of the assignments are too difficult in view of the qualities of the majority of pupils. Some of the assignments should be formulated more precisely. The author assesses the methodological handbook which accompanies the textbook in a positive manner.

10.83

517. SINDEL, I. - ÁRENDÁS, V. - VETÉSSY, K. - SZERÉNYI, G.- TAKÁCS, A.: A Biológia III. tankönyv tanításának tapasztalatai III. /Experiences in teaching according to the new textbook "Biology III"./

A biológia tanítása, 19, 1980, No.3, pp.73-84.

Five secondary school teachers here describe their own experiences in the use of this experimental textbook. They express agreement with the opinion that the textbook is entirely different from the ones which have been in use until now. This textbook contains only basic facts. This can represent difficulties for some pupils. All the authors are in agreement that there is too little time available to go through the book because of the large number of tests and the experimental excercising of the subject-matter found in the textbook. This time is then lacking for repetitions, etc. A positive aspects of the textbook is the fact that it leads pupils to being active and improves their independent work. The authors also agree with how interdisciplinary aspects are dealt with, as well as with the suitable use of illustrations, and the evolutionary approach used in the structuralisation of the subject-matter, etc. All the authors come to the conclusion that together with suitable teaching media, the textbook can become an excellent aid both for pupils and teachers.

10.83

518. STAWIŃSKI, W. - PALKA, L.: Testy rozumienia o podrecznikow biologii. /Tests for determining the comprehensibility of biology textbooks./

Biologia w szkole, 33, 1980, No.4, pp.236-239.
1 tab.

Studies of textbooks are being done all over the world, especially in the US and Great Britain,were a number of methods have been developed for this purpose. The content of textbooks are studied, as well as the difficulty of comprehending the terms and notions in the book, its linguistic complexity and how easily pupils can understand the text. The Royal Institute for the Didactics of Biology carried out, during the academic years 1976-1979, a project which included several tests whose purpose was to determine the extent to which pupils understood the experimental biology textbook for the 4th and 6th classes. All the structural elements in the textbook were studied, including its information component /terms, definitions, verbal explanations, illustrations, instructions for observations, questions and assignments/. The task of the pupil was for instance to read and explain a part of the textbook, to cite specific examples in the text, to use the text as an instruction for dealing with some of the assignments, to make a drawing or outline according to the illustrations in the textbook. Also the structure of the textbook was examined. Pupils were asked to express the content of what has been read in their own words, to express what information they had gained from the illustrations in the text, to carry out various comparisons between organisms or phenomena and express their mutual relation. In a table attached to the article the authors provide a selection of various operations and examples of assignments given to pupils within the framework of the described tests.

10.83
519. Unterrichtshilfen Biologie Klasse 9 /Auszugsweiser Voradbruck/. /A methodological manual for teaching biology in the 9th class/an example based on a pre-publication copy/./

Biologie in der Schule, 29, 1980, No.7/8, pp.339-344.

The example upon which the article is based concerns the topic An Introduction to the Plant Kingdom /1 lesson/ and The Structure and Metabolism of Plants with Vessels /10 hours/. Preliminary comments are offered and suggestions made for a division of the subject-matter into individual lessons. Also links to previously learnt knowledge and interdisciplinary relations, as well as recommended teaching media, observations and relations to textbook are discussed.

10.83
520. Unterrichtshilfen Biologie Klasse 11 /Auszugsweiser Voradbruck/. /A methodological manual for teaching biology in the 11th class /an example based on a pre-publication copy/./

Biologie in der Schule, 29, 1980, No.7/8, pp.329-333.

This chapter of a methodological manual advises on the didactical preparation for teaching the topic

Systematics, which is the openning topic of biology teaching in general education secondary schools and thus forms the basis for the teaching of ecology, physiology and genetics. The planning and division of the subject matter into 4 lessons is described, including suggestions for the use of teaching aids, carrying out various experiments and working with the textbook. Also the internal and external interdisciplinary relations existring in this subject-matter are analysed. The topic Viruses, Bacteria and Plants, taught in 6 lessohs , is also analysed.

10.84
521. BRINSMEAD, G.S.J. - WELLARD, R.: Simulation as a teaching strategy - the case of Newport.
The Australian Science Teachers Journal, 24, 1978, No.1, pp.23-28.
2 figs.

Simulation is a very effective teaching method in which pupils learn to play various games. The planning of a new power plant to be built in Newport for the city of Melbourne provided an excellent opportunity to carry out such simulation with the aid of games. The authors, together with others, prepared the material which is composed of a manual for teachers, a set of 12 slides, a set of playing cards with the scenario of various situations and data for the students, together with other information. The students then seek solutions for the situations which are being simulated, which of course are based on actual conditions. Students learn to analyse and process data gained from a map, from graphs and statistical sources, to follow up their findings in view of the problems concerning the geography and environment of the locality, etc. The simulation game at first ran into various reservations, but in the final analysis the teachers assessed the game in a positive manner, especially as far as student motivation was concerned.

10.84
522. COLLINS, B.G.: Individualized science instruction - past, present and future.

The Australian Science Teachers Journal, 25, 1979, No.1, pp.23-28.

One of the most serious problems every educator must deal with is to even out the difference which exist between intellectual capacity and learning among various students. Many methods of work have been developed for this purpose and one of the most effective is individualized instruction. The author sums up the outcome of two of the most popular approaches to this problem: teaching with audio-visual aids and on the basis of a programmed universal course. The former method is especially popular in the natural sciences. It was first developed in the sixties in the USA and uses tape recordings, various accompanying material, laboratory experiments, discussions, films, lectures, and demonstrations. Recently this has been combined with a modular type of lecture. The universal type programme includes for instance Bloom´s programme and the Keller project. The author also mentions the coordination of both approaches which in recent years has been applied in a number of schools. In conclusion the outlooks for the further development of individualized instruction are discussed.

10.84

523. FISH, G.: The development of a K-6 science programme at Flinders Island district high school.

The Australian Science Teachers Journal, 24, 1978, No.2, pp.45-50.
1 fig., 1 appendix.

The author provides a survey of the development of science courses in high schools with special stress on the implementation of the K-6 programme for the 6th class. In 1973 a new approach began to be developed with the aim of science becoming a living component of the experience of each student. Through the natural sciences, school can help children to acquire skills, knowledge and attitudes which will lead to their positive interaction with the environment. The new approach has lead to the introduction of a new science syllabus, which above all stresses pupils' activity. In planning this new syllabus some further aspects should be taken into account and the author enumerates them. In conclusion the specific nature science course at the Flinders Island high school is described. The appendix contains a survey of individual topics with recommendations for the use of various materials and aids.

10.84

524. HILL, D.M. - BAILEY, J.A. - MEAD, R.T.: A model for materials development: ASMP.

The Australian Science Teachers Journal, 25, 1979, No.1, pp.35-39.
1 fig.

The article describes the Agricultural Science Materials Project /ASMP/ which is for the 12 to 16 year age group, i.e. for teaching in secondary schools. The original project was later further developed and various changes were introduced. Its aim it to develop students' knowledge of the natural science through their observations and by practical experiments. Each unit it formed by several parts: a presentation by the teacher, the students' individual study of a text, supplementary questions are answered and auxilliary materials used. The whole project includes 25 topics /or units/ concerning all areas of agriculture. The introduction of the project into schools requires two prerequisites: having teachers participate in the finding of suitable materials and makihg these materials at relatively low costs. In conclusion the author sums up the experiences gained in the experimental introduction of the project in some schools.

10.84

525. MIKHAYLOV, V.D.: Iz opyta programmirovannogo ucheta znaniy uchashchikhsya po botanike. /The experiences gained in the programmed assessment of pupils'knowledge in botany./

Biologiya v shkole, 54, 1980, No.6, pp.50-51.

The article cites simple examples of the programmed testing of pupils' knowledge in the following topics: seeds, roots, blooming plants and their classification. The assignments can be given in the form of cards with written questions, so that no machines are needed for the assessment.

10.84

526. MONIUSZKO, L.: Jak przebiega rozwój tasiemców. Konspekt lekcji programowaney w kl. VII. /How a tapeworm develops. Preparations for a programmed lesson in the 7th class./

Biologia w szkole, 33, 1980, No.5, pp.295-297.
1 tab., 1 model programme.

The author describes a lesson in the 7th class concerning the development of the tapeworm, with the use of a programme. He points to the increased interest of pupils. The aim of the lesson is to acquaint pupils with the development of the pork tapeworm and the beef tapeworm and their hosts and way of life. Pupils should be informed about the possibility of being infected by tapeworms and how this can be prevented. The lesson uses problem teaching, work with a programme and the textbook. As homework, the pupils fill in a prepared table concerning a comparison of both tapeworms, their way of life, hosts and stages of development. The author also describes in detail the course of the lesson.

10.84

527. NEWLANDS, J.: A school based mastery learning project using ASEP materials.

The Australian Science Teachers Journal, 25, 1979, No 1, pp.29-33.
3 figs.

The article describes a teaching innovation for use in natural science courses which is used in Australia; it has been developed by the teachers themselves, who use it in their class work. The project is called the Australian Science Education Project and is a form of universal instruction as originated by Bloom and Block, whose work is briefly described by the author. Essentially, this method of individualized instruction makes it possible for slower learners to achieve much better results in comparison to traditional methods. The author distinguishes between Keller's and Bloom's method of universal instruction, which differ in the procedures used when a student gives a wrong answer. The described project uses the Keller method, which requires less time. On this basis the author's students have already done 3 units of the ASEP materials: genetics, metals and solar energy. Each student could chose the topic he wanted to do. For the purpose of the research project the students kept a special diary concerning the given problem. After some time the programme was terminated, but the materials will continue to be used.

10.85
528. BECKMANN, H.: Erfahrungen aus der Arbeit mit Aufgabensammlungen. /Experience with work with collections of assignments./

Biologie in der Schule, 29, 1980, No.2/3, pp.72-73.

The article is a rejoinder to an article written by the teacher Naunapper /in Biologie in der Schule, 1979, No.10/. In the school where the author teaches, a collection of 25 assignments has been in use for some time; they make it possible, among others, to systematically prepare pupils for their examinations. The author describes in detail his experiences with these assignments.

10.85
529. BRESSLER, W.: Prüfungsvorbereitung - aber wie ? /Preparing for exams - but how ?/

Biologie in der Schule, 29, 1980, No.6, p.255.

The author here reacts to an article written by L. Naunapper /Biologie in der Schule, No.10, 1979/. He acquaints readers with a method of teaching he has been using for some time. It is based on the regular and systematic repetition of the material taught and besides the pupils' oral performance also their worksheets are taken into account. The advantages of this system are described extensively.

10.85

530. DATSON, C.R.: An evaluation of an ASEP unit and teacher estimate of pupil Piagetian stage of development by correlation studies.

The Australian Science Teachers Journal, 25, 1979,
No.1, pp.63-66.
2 tabs.

In view of the fact that the school performance of students is influenced by the quality of their development, it is useful for the teacher to first determine their cognitive development level and on this basis to chose the best method of teaching. The Australian Science Education Project /ASEP/ units are adjusted to such various stages of development, even if this is not always true of all of them. The author in this article acquaints the reader with a method by which the teacher can determine the development stage of his pupils and then on this basis chose the correct ASER topic. The topic "transportation" was chosen as an example for which a project was organised on the basis of a test designed by Tischer and Dale in which 49 students were studied and their aptitudes determined. The test contained 15 questions, 8 of which concerned acquired knowledge and 7 questions concerned the ability to analyse and make applications. The criteria were in accord with Piaget's degrees of intellectual development. The outcome of the test was statistically analysed with a t-test.

10.85

531. FOREMAN, B.: A role-playing strategy for land development conflict studies.

The Australian Science Teachers Journal, 24, 1978, No.1, pp.37-45.
3 figs.

The author describes a method of ecology teaching, which in this case concentrates on conflicting points of view concerning the utilization of a specific piece of land. The students spent a week in a school camp, located in the Arburak National Park in southern Australia; their school work prior to the stay at the camp aimed at preparing them for this week of field work. They learnt various knowledge and techniques pertinent to solving problems concerning the influence of man on nature and the environment. In the camp they received specific assignments to solve. First they became acquainted with the vegetation in the vicinity of the camp, as well as the fauna living in the territory. They then studied the ecology of fresh water flora and fauna in a local pond and in a lake formed by a dam. During the game itself the students took on the roles of various government institutions and a hypothetical conflict situation was studied, which included among others, the decision whether the building of a city should be permitted on the territory of the camp.

420

10.85

532. GEHLHAAR, K.H.: Möglichkeiten der Gestaltung von Arbeitsblättern zur Festigung der Lernergebnisse. /The opportunity of using worksheets to strengthen the outcome of learning./

Biologie in der Schule, 29, 1980, No.2/3, pp.63-68. 15 figs.

The author develops his theme on the assumption that after pupils first become acquainted with the subject-matter being taught the process of learning has not yet been concluded and that various measures should be undertaken to strenghthen what has been learnt in the minds of the pupils. Practical experience has indicated that the most often used methods for this purpose include the use of a picture on the blackboard, the use of a textbook, workbook, natural artefacts and transparencies, but that worksheets and slides are used to a much lesser extent. The author analyses the reasons why worksheets are used so little and from the point of view of psychology stresses their advantages. He cites examples from various areas of biology.

10.85

533. KAYE, J.: Moulding minds by simulation: A critique of "A role playing strategy for land development conflict studies".

The Australian Science Teachers Journal, 25, 1979, No.1, pp.59-62.

In this article the author reacts to an article by B. Foreman, published in this journal in 1978. Foreman described a method of simulating conflict situations by a game in the course of ecology teaching. In spite of the fact that such an approach is very interesting and stimulates students towards being active in class, the author nevertheless has two reservations. The first is the strong emotional element in this approach because it is quite evident that Foreman considers urban development to be something negative. Students learn to be predjudiced from the very beginning, they to not learn to form an objective point of view. The other reservation is the fact that only part of the given problem is taught and discussed, not the problem in its whole complexity. "Judith Kays's Critique of Foreman's Article: A Reply" by Allen Reid has been added to the article. Here the author expresses support for Ms Kaye's opinions in criticising B. Foreman.

10.85
534. RATZSCH, J.: Ermittlung und Bewertung von Schülerleistungen unter Nutzung von Aufgabensammlungen.
/Determining and assessing pupils' achievements on the basis of a collection of assignments./

Biologie in der Schule, 29, 1980, No.6, pp.252-254.

The District Committee for Biology Teaching traditionally analyses the quality of the knowledge and skills attained by pupils at the end of the first term. This assessment concentrates on the basic subject matter taught and how pedagogical principles are implemented. Specific examples are cited from the 8th class /the assignments are described and explained/.

6

10.85
535. SCHUBERT, F.: Zur Diskussion über Probleme des Übens, des Systematisierung und des Erkennens des Wesentlichen. /Concerning the discussion on problems of excercises, systematisation and learning the essential./

Biologie in der Schule, 29, 1980, No.9, pp.372-373.

The author here reacts to two articles published in "Biologie in der Schule". First he expresses his opinion concerning worksheets, which serve to strengthen what has been learnt. He adds further aspects of the problem to those which have already been published elsewhere. In the following part of the article he expresses his opinion on a diagram representing physiological processes. He supports this idea and describes his own experiences with the use of such diagrams in classwork.

10.85
536. SZEBERÉNYI, I.: Alkalmazásoteszt feldadatok biologiából II. /Didactical biology tests II./

A biologia tanítása, 19, 1980, No.1, pp.13-19.
3 figs.

The author provides various suggestions for designing tests concerning specific subjects. The answers to the questions he poses can very /multiple choice answers, simple filling in, multiple filling in, etc./, thus providing the tests with variety. The author provides examples of test questions on the following topics: the metabolism relation existing between blood and the tissues; the laws governing the heredity of two signs in the Drosophila fly;

changes in partial pressure of gases in the arteries and veins. Between individual questions, there are paragraphs of text which lead to the next question and also experiments pertinent to some of the questions are cited. At the end of the article the author provides correct answers.

10.85
537. SZEBERÉNYI, J.: Alkalmazás-teszt feladatok biológiából III. /Didactical biology tests III./
A biológia tanítása, 19, 1980, No.2, pp.47-57.
2 figs.

The article contains a discussion of the concrete design of didactical tests on especially the following biology topics:

- the physiology of the digestive system /determining the purpose of surgery on the basis of a given diagnosis/
- the synthesis of proteins
- the activity of the heart
- heredity of blood groups /questions concerning a specifically cited geneology/.

At the end of the article correct answers are given.

10.85
538. SZEBERÉNYI, J.: Alkamazás-teszt feladatok biológiából IV. /Didactical biology tests IV./
A biológia tanítása, 19, 1980, No.3, pp.85-86.

The author here designs a combined test concerning the problem of the function of the thyroid gland in the thermal regulation of the body. In an experiment described, two groups of rats are fed fodder which differs in the quantity of iodine it contains. The whole topic is examined from all angles, in relation to properly formulating questions.

10.85

539. SZEBERÉNYI, J.: Alkalmazás-teszt feladatok biológiából V. /Didactical biology tests V./

A biológia tanítása, 19, 1980, No.4, pp.120-121.

Here the author submits a total of 10 questions concerning genetics in the form of a test. They all concern the monogenetical heredity of feather colours in poultry.

10.85

540. SZEBERÉNYI, J.: Alkalmazás-teszt feladatok biológiából VI. /Didactical biology tests VI./

A biológia tanítása, 19, 1980, No.6, pp.186-189.

The author suggests 12 questions concerning neurophysiology in the form of a combined didactical test.

10.85

541. WALKER-HENDRIX-MERTENS: Sequenced instruction in genetics and Piagetian cognitive development.

The American Biology Teacher, 42, 1980, No.2, pp. 104-108.

The article develops the pedagogical theories of Jean Piaget concerning teaching through activities and applies Piaget's theories to the specific activities undertaken during the teaching of genetics. Mendel's genetic laws are a topic of teaching for which the author provides tests, whose aim it is to determine the achievement of the student.

10.85
542. WILMOT, G.: ACER science test.

The Australian Science Teachers Journal, 24, 1978, No. 2, pp.69-72.

ACER /Australian Committee for Educational Research/ has produced a series of tests for the physics course in the 11th and 12th classes which supplements tests for chemistry and biology which have already been designed previously. The author describes the history of the physics tests, describes them and also compares them to the chemistry and biology tests. The physics tests are composed of 21 units, which contain a total of 550 questions, which have multiple choice answers /usually 4 answers/. A number of questions include pictures. The tests can be used as a diagnostic aid; they continue in the subject-matter of standard learning texts. The tests are accompanied by a booklet which contains the correct answers. Similar tests have already been produced for biology /a series of 15 tests with 400 questions/ and for chemistry /18 tests from 9 areas/.

10.85

543. WŁOSIK, E.: Krzyżowki jako forma utrwalania pojeć i terminóv biologicznych. /Crossword puzzles as a form of strengthening the knowledge of biological concepts and terms./

Biologia w szkole, 33, 1980, No.3, pp.179-185.
14 crossword puzzles.

One of the important tasks of biology teaching is to strengthen the knowledge of biological concepts and basic biological terms. A lack of knowledge of basic terms and concepts causes great difficulties in subsequent study. It is thus necessary to find an attractive method of improving this learning. One such method is the use of various types of crossword puzzles. The author describes her own experiences with their use in the 5th and 6th classes. She has the crosswords printed on separate cards, which the pupil can paste into his notebook and do either in class or as homework. The crosswords deal only with material which has just been taught and are usually in two versions, one easier and the other more difficult. The author provides several examples of such crossword puzzles in the article, which concern problems of the leaf, bloom, fruit and seed, roots and stem of a plant, life in a pond, in the forest and fields, problems concerning soil, bacteria, algae, fungi, lichens, moss and ferns, as well as angiosperms. The use of crossword puzzles in biology teaching has brought very favourable results.

10.86

544. DEGNER, I.: Bestimmungsschlüssel für Hirscheentwickelt von einer Arbeitsgemeinschaft "Säugetiere". /A key to identifying the Cervidae, drawn up by the "Mammal Studies" hobby club./

Biologie in der Schule, 29, 1980, No.11, pp.483-486.
6 figs.

There is an increased interest in becoming acquainted with animals, especially among people living in cities. For a hobby club active in a ZOO it is important for the pupils to learn about the habitus and behaviour of animals and also to become acquainted with the problems connected with their breeding in captivity. The pupils of the 5th and 6th classes are already acquainted with the foundations of systematics and with the identification of fauna according to the dichotomic method. On this basis a hobby club from the city of Rostock drew up a key to identifying the Cervidae. They first deal with the family and then with individual species, including for instance the elk, reindeer , fallow dear and roebuck.

10.86

545. WARD, M.: A guide to some common chalk fossils.

Natural Science in the Schools, 17, 1979, No.2, pp. 45-51.
8 figs.

The collection of fossils can be a very interesting hobby both for students and teachers, and children will gain an extended interest in nature studies. The article describes the collection of common chalk fossils, with descriptions of the geological strata and conditions in which they can be found. Also the most important representatives of various groups of protozoa /especially Foraminifera/, fungi, Coelenterata /corals/, Annelida, Bryozoa, Cephalopoda, mollusca, Echinodermata and Chordata are described. Each genus or specie is briefly described. The article contains a number of very clear drawings.

10.87

546. O'BRIEN, P.J. - HUETHER, C.A. - PHULLIBER, S.G.: Teacher knowledge and use for population education materials: Report from National Surveys.

Science Education, 62, 1978, No.4, pp.429-442.
6 tabs., 1 appendix.

Population education is important for two reasons: to improve birth control and to teach people how to decide on the basis of knowledge concerning the consequences of overpopulation. One of the important mechanisms for population education in the United States is the development and appliestion of various materials on the subject. The aim of the article is to inform the reader of a project which investigated the use of 20 various materials by two samples of teachers. Both groups of teachers received questionnairs; the response rate was 47 and 46%. The article analyses both groups of responses as far as achieved education, locality, teaching specialization and type of school where the respondent teaches are concerned. The findings are summed up in tables and a detailed discussion is submitted. The appendix contains a bibliography of materials used.

429

10.87

547. KUMMER, G.: Zum neuen Jahr. /At the occasion of the New Year./

Biologie in der Schule, 29, 1980, No.1, pp.1-3.

An editorial which discusses the aims of the journal, whose basic activities are based on the resolutions of the VIIIth Pedagogical Congress. A survey of articles published in the previous year is offered. 591 active teachers wrote the majority of articles. In the year 1980 the journal plans to concentrate on acquainting readers with the new curricula a syllabi, an assessment of final examinations in the 10th and 12th classes, the work of hobby clubs and the activation of pupils through problem teaching. Attention will also be paid to the information provided by teachers and to the questions posed by them. Specialized articles will concern ecology, nature conservation, technical microbiology and health education.

10.88

548. BEESON, G.W. - FLETCHER, J.: Talking books for poor readers.

The Australian Science Teachers Journal, 25, 1979, No. 5, p.13.

The article discusses problems of teaching in a class where children are poor readers. These students have important communication problems. The example of two such children are cited, who had to depend only on the oral explanations provided by the teacher. Experiments were undertaken with taped texts, where the narration was very slow. In subsequent years the cassets were used repeatedly and gradually improved upon. Some of the pupils were reluctant to use the cassetes; this was overcome by the teacher by at first using films and later also cassetes for all pupils. The authors of the project have attempted to carry out an objective assessment of this type of teaching. First they discuss the Australian Science Education Project and the readability of its texts. They describe in detail the effectiveness and the outcome of the use of books read out loud and recorded on tape. They seek an answer to two questions - whether this method helped poor readers to understand the biology subject-matter and whether it can be applied to a small group of poor readers within a normal class.

10.88

549. CASSUBE, M. - WINDELBAND, A.: *Popularwissenschaftliche Literatur für das Stoffgebeit "Abstammungslehre" in Klasse 10.* /Popular scientific literature concerning the topic "Phylogeny" in the 10th class./

Biologie in der Schule, 29, 1980, No.1, pp.12-20.
3 figs.

Information found in popular science literature can be used to improve the educational impact of teaching. On the basis of the example of the topic "Phylogeny" the author discusses the phylogeny of plants and animals, the developmentof life on Earth, the evolution of man, the history of evolution theory and others. The authors point to opportunities using elements of problem teaching. The basis of a problem situation are provided by two seemingly opposite claims, both found in such supplementary literature. The authors provide two different surveys of such work, which can be used for the purpose.

10.88

550. CICHY, D.: Z okazji 35 lekcia "Chrońmy przyrode, ojczysta,
/At the occasion of the 35th anniversary of the journal "Chrońmy przyrode ojczsta"./
Biologia w szkole, 33, 1980, No.1, p. 59.

The journal cited in the title /which means "Let us conserve our nature"/ has been published since 1945. It began publication on the basis of the incitiative of prof. W. Szafer after the end of World War II. 6 issues are published annually. Since 1948 it has been published by the Ministry of Education and distributed to schools. Each issue contains articles on nature conservation, correspondence and various current information related to the subject of conservation. Each issue has approximately 100 pages and is a valuable aid to biology teachers in all levels of schools.

10.88

551. DEAKIN, G.: Scientists, science and society in literature.
The Australian Science Teachers Journal, 26, 1980, No.1, pp.9-14.

Fiction and popular literature, as well as the mass media often extert an influence which is in contrast to the influence of formal science as it is taught in schools in the course of forming ideas on science in the minds of students. Fiction in the majority of cases brings a negative, and most important of all, obsolete image of modern sicence. The author cites three examples of such attitudes in the works of three authors: Arthur Koestler, John Steinbeck and Bertold Brecht. He analyses and comments the opinions of these three authors concerning modern science and society. The author quotes Brecht against Steinbeck: "I think I am beginning to understand science a little....".

10.88

552. DUNDA, K.: Čtenáři časopisu ABC pomáhali entomologům. /The readers of the journal ABC have helped entomologists./

Přírodní vědy ve škole, 31, 1979/1980, No.3, p.95.

Successful cooperation between the readers of the magazine ABC, which is published for children, and the Entomological Department of the National Museum in Prague with the Czechoslovak Entomological Society of the Academy of Sciences, has lasted for 15 yeres; it has concentrated on looking for migrant moths on the territory of Czechoslovakia. The name of the project was "Look for the Death's head moth". The children were asked to report the incidence of this Hawk moth on the basis of instructions, a detailed description and the relevant illustrations. Later two other species were added: Herse convolvuli and Daphnis nerii. The project brought needed evidence for the entomologists and served at the same time as an interesting hobby club activity for children in nature studies.

10.88

553. ZEDER, G.: Zur Nutzung des Kinderbuches für den Biologieunterricht und die ausserunterrichtliche Bildungs- und Erziehungsarbeit. /On the use of books for children in biology instruction and for extracurricula activities and education./

Biologie in der Schule, 29, 1980, No.11, pp.472-475.

The use of books by children in class work makes it possible to make a number of problems more comprehensible and also leads to the creation of a positive attitude towards biology, animals and plants. The forms in which books for children can be used include the following: reading the book, their use on a bulletin board, discussions, organized polemics. The author documents this on the basis of two specific books.

10.88

554. SCHUBERT, F.: Ein Zeitungsartikel als Grundlage biologischen Arbeitsmaterials. /Newspaper articles as basic work material for class work in biology./

Biologie in der Schule, 29, 1980, No.4, pp.141-142.

One of the aims of instruction is to train pupils to understand biological phenomena in the every-day life of society and their own lives. The author finds that the use of various articles or parts of articles from newspapers, magazines and books is very helpful. He cites the example of an article called "Cosmetics for Stagnant Waters".

10.88

555. TESAŘÍK, B.: Časopis "Biologija morja". /The journal "Biologiya morya"./

Přírodní vědy ve škole, 31, 1979/80, No.9, pp.333-334.

This bi-monthy journal, published by Nauka Publishers in Vladivostok, in the USSR, contains articles on basic and applied research concerning the biology of the seas, as well as articles of a methodological nature and practical experiences from conservation work and the rational utilization and economics of the biological aspects of the seas and oceans.

10.89

556. KALINOVA, G.S.: Vedeniye tetradi po biologii. /Keeping a biology notebook./

Biologiya v shkole, 54, 1980, No.5, pp.23-28.

On the basis of the optimum keeping of biology notebooks, the author make specific the resolution of the Central Committee of the Communist Party of the Soviet Union called "For the further improvement of teaching and education of pupils in general education schools and their training for work", which assigns, among others, the task of increasing the effectiveness and quality of educational and teaching work in such a manner that each lesson develops the cognitive interests of pupils and the acquisition by pupils of the habit of independently supplementing their knowledge.

In work with a notebook, pupils can carry out various assignments, such as the following:

1. filling in a table, drawing an outline, filling in a drawing;

2. drawing up plans and making summaries;

3. making summaries and drawing conclusions on the basis of laboratory work, programmes broadcast by educationa TV, the screening of documentary films, showing of slide series;

5. summaries of excursions into nature or factories;

6. the formulation of a scientific problem and the plan of a project for its solution;

7. written examinations.

On the basis of the example of the 5th and 6th classes the author cites specific examples of work with a notebook, especially in the learning of new subject-matter /the structure of seeds of monocots and dicots/, the reinforcement of knowledge /the structure of the leaf/, testing of knowledge /the stem/, records of laboratory work /the roots, an autumn excursion/, etc.

All the various tasks which the pupils write up in their notebooks should be included in a single notebook, where the last few pages are left empty for filling in items in a dictionary of biological terms.

10.89

557. THIEMIG, E. - PEITZ, E.: Saubere und übersichtliche Hefgerführung - nicht mur eine Frage der Ordnung.
/A clean and orderly notebook is not only a question of order./

Biologie in der Schule, 29, 1980, No.10, pp.431-434.

The aesthetical education of pupils is increasingly important. One of its aspects concerns the keeping of a notebook by a pupil. At a school in Arnsdorf near Dresden much attention is devoted to the quality of keeping notebooks. However, the excertion and thoroughness expended on this problem have borne their fruit. In working with notebooks the authors distinguish notes on new subject-matter and excercises and repetitions. They clarify how these should be organised. In conclusion they express their opinions on how to assess the quality of notebooks. They assess their neatness and factual correctness, correct and clear writing, the correct spelling of new terms, how clean the notebooks are and their aesthetical quality. The outcome of instruction has improved after all this was introduced.

10.89

558. VOLKOV, V.A.: Primeneniye trafaretov na urokakh zoologii. /The use of stencils in zoology lessons./ Biologiya v shkole, 54, 1980, No.5, pp.32-33.

The author acquaints the reader with a system of stencils which enable pupils to draw idèntical outlines of various objects in the course of biology class work. The stencils of various objects are made by pupils /during hobby club work/ out of cardboard. The size of the stencils is from 75 mm /for an amoeba/ up to 160 mm /for a frog/. During the lesson pupils gradually fill in drawings of the internal and external organs of the organism in question, according to various transparencies. The article includes, as an example, 4 pictures which explain the external structure of a frog's body.

10.9
559. CHASTON, S.H.H.: Reductant oxidant ~~acle~~ scales.

The Australian Science Teachers Journal, 24, 1978, No. 2, pp.121-123.
4 figs.

The article describes several types of redox scales. These are single-dimensional graphic representations of a Nernst equation at 25°C. The examples cited in the article show how some reduction oxidation problems can be solved visually on the basis of a scale. The examples concern the position of two redox pairs on a scale /for bivalent and trivalent iron; trivalent and tetravalent cerium/. The relative position of the pairs can be determined experimentally on the basis of reactions between bivalent iron and tetravalent cerium or trivalent cerium and iron. Another example demonstrates in a similar manner the relation between bivalent and tetravalent tin, bi- and trivalent iron and a molecule of bromine and negative univalent bromine. The final example concerns a mercury scale, one for chloride anions, silver and silver cations.

10.9
560. SWINDELL, R.: A solar still.

The Australian Science Teachers Journal, 24, 1978, No. 3, pp.111-114.
4 figs.

The author describes a school experiment which uses solar energy for the destillation of polluted water. The article is written in the form of a conversation between a teacher and a pupil, where the teacher explains how the described apparatus works. It is composed of a simple closed box, where the back wall is extended. The box is covered with plate glass which is inclined. On the floor of the box there is a vessel with the dirty water and in the front lowest part of the box another vessel for collecting the distilled, clean water. The dirty water evaporates due to the action of solar rays, the vapours condense on the cool curface of the glass and the clean water is collected in a vessel. A similar method can be used on field trips. A small excavation in the ground /in a swampy area/ filled with water is covered by a transparent platic foil and a vessel for the clean water is placed at the bottom of the excavation, under the lowest point of the plastic foil, which has been weighed down with a rock. The author alsc describes an experiment where the students study whether light passes through a glass plate more easily than heat does.

10.9
561. SZTANYIK, J.: Házi sokszorosító. /A home-made copying device./

A biológia tanítása, 19, 1980, No.6, pp.190_191.
2 figs.

The author provides instructions for making a very simple home-made copying device which can be made very inexpensively. It is then used for copying worksheets, drawings, tests, etc. Two pictures show how the device is used.

10.91

562. **KEELING, R.P.:** A low cost thermistor device for measurements of metabolic heat in yeast cells in suspension.

Journal of Biological Education, 14, 1980, No.1, pp. 36-40.
5 figs.

The article contains brief instructions on how to make a low cost device for measuring metabolic heat in yeast cells in bakers yeast. This is made easier by the pictures attached to the article and by an enumeration of the material neede. Also the methods of use and materials needed for carrying out experiments with the device are described. In cocnlusion, the size of the device is given and its various uses are described.

10.92

563. **ANDERSON, K.J.:** A transport for a biological sciences department.

Journal of Biological Education, 14, 1980, No.1, pp.11-14.
3 figs.

The article describes the activities of a mobile biology laboratory, which has been adapted from an older lorry by the students of the school where the author teachers and by their parents. During excursions the laboratory serves for experiments done on the spot and makes it possible to classify collected biological material and make measurements while the material is still fresh as far as its chemical composition, microbiology components, etc. are concerned. The lorry also serves as a shelter during sudden changes of the weather for a number of students.

10.92

564. FARCHMIN, W.: Quantitativer und qualitativer Nachweis von Mikroorganismen im Schulunterricht mit Hilfe von Membranfiltern. /Quantitative and qualitative proof of microorganisms in school work with the aid of a membrane filter./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 9, pp.281-283.
5 figs.

The microbiological study of liquids and gases has made it possible during the last two decades to carry out a very precise inspection of products and raw materials. The same is true of the inspection of hygienically safe and pure clinical environments and the microbiological inspection of substances which are difficult to filter. Membrane filters, which are the main concern of the paper, are easy to acquire and they are inexpensive. They can thus also be used for school experiments aimed at providing quantitative and qualitative proof of the presence of microorganisms. Membrane filters are spongelike structures with a large internal surface and volume. They are easy to use and can also be used in devices disigned for field work or with a device for pressure or underpressure filtration. They can be used for water inspection, for proving the presence of Escherichia coli, to determine the safety of non-alcoholic beverages, yeast and mildew, milk bacteria, germs tolerant to acidic environments, the inspection of beer, wine, milk, sugar and other foods.

10.92

565. HOFFMANN, D.: Schaltplatine zum Neuron-Simulator.
/Panel for making a neuron simulator./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 11, pp.350-351.
1 fig.

The article brings supplementary information to an article concerning a neuron simulator written by F. Hebauer, which was published in this journal, volume 28, 1979, No.3. It described the needed material - a pertinax or epoxy panel with a copper foil and printed circuits. A photograph shows both sides of the panel - one for the printed circuits and the other for the connection of other parts of the simulator. All technical data are provided.

10.92

566. KEIL, J.: Erfahrungen mit einem Arbeitsgerätesatz.
/Experiences with a work kit./

Biologie in der Schule, 29, 1980, No.12, pp.512-514.

One of the tasks of biology teaching is the development of experimental and observational skills. The use of a microscope is of great importance for independent observation. For this a set of various instruments and devices must be used. On the basis of his own experience, the author has developed his own work kit for semi-microtechniques, which he describes in great detail. The kit includes glass slides, other materials for microscopy, a collection of mounting tools, a magnifying glass and various chemicals.

10.92

567. KONDICS, L.: Iskolai kimográf építése. /Making a school cymograph./

A biológia tanítása, 19, 1980, No.3, pp.87-91.
7 figs.

The author points out the varied uses to which a cymograph might be put in schools and the fact that they are not used offen. This is probably because most schools do not own such in instrument. After a brief description of its uses, the author describes how one can be made directly in the school out of inexpensive and available materials. The pictures attached to the article show the instrument and its electrical circuits and provide details for making it.

10.92

568. KONDICS, L.: Néhány tartozék készítése az iskolai kimográfhoz. /Making the accessories for a school cymograph./

A biológia tanítása, 19, 1980, No.4, pp.122-125.
7 figs.

The article continues in the subject-matter of an article published in a preceding issue of this journal concerning the making of a school cymograph. Here the author concentrates on the making of the recording device for the instrument and provides detailed descriptions of the material needed for making it, including types of paper, how to adjust the paper, its colour, etc. The description of the instrument is supplemented with 7 pictures, including those of various details.

10.92

569. KRÜGER, K.G.: Anleitung zum Bau eines "Streifenzylinders". /Instructions for making a striped cylinder./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 8, pp.250-251.
3 figs.

The author described the making of a striped cylinder, which is then used as an experimental device for experiments in opto-motor reactions of various specie of insects. It is also suitable for use in class work concerning the topic "The sensory organs as a medium between organisms and their environment". The author makes two suggestions and for both provides drawings on how to proceed.

10.92

570. LEDOUX, G.: Calculatrices programmables et Sciences naturales. /Minicalculators with programmes and the natural sciences./

Biologie-Géologie, 67, 1980, No.1, pp.293-407.
3 figs.

The use of minicalculators has become a more or less normal thing even in basic school. The article describes the use of a programmable calculator for which a simple /not biological/ programme has been developed; the article describes the basic principles of making up such a programme and how to adapt it to dealing with biological problems, which for instance can simulate conditioned reflexes in an animal. Such a programme can be considered as experimental and its course can be improved by the user.

10.92

571. LUCAS, K.B.: Stellar magnitudes: Iris photometry of stellar photographs.

The Australian Science Teachers Journal, 25, 1979, No. 2, pp.95-97.
1 fig., 2 tabs.

Iris photometry is an aid which provides a simple, speedy and precise method of determining stellar magnitudes on the basis of photographs. The article describes an excercise which is intended to be the introduction to work with an iris photometer and teaches students to deduce data from the photographs taken of the stellar group M 67. An outline of the photograph is provided in the article. The device is relatively simple - from a scanning cathode-ray tube the stellar image is transmitted with the aid of an oscilloscope and a system of mirrors and lenses to a photographic plate. On the basis of known date concerning 20 stars in the group M 67 a calibration of the iris photometer is carried out. On the basis of the calibration curve it is then possible to fill in the size of those stellar bodies which are not known. In the excercise described by the author such measurements are carried out for three stars. Added to the article are 5 questions, which can serve as assignments for further work in this subject-matter. They concern especially the function of an iris photometer and some of the properties of standard and newly measured stellar bodies.

10.92
572. MÜLLER, H. - OBERHARDT, E.: Kulturgefäss für pflanzenphysiologische Experimente. /A vessel for experiments in plant physiology./

Biologie in der Schule, 29, 1980, No.2/3, pp.76-77.
1 fig.

The authors describe the making of a vessel, in spite of the fact that similar vessels are available commercially. The advantage of this particular model is that it makes observation easier. The authors describe suitable material and how to procede. The vessel can be used for instance for observations of germinating seeds.

10.92
573. SWINDELL, R.: A methane digester.

The Australian Science Teqchers Journal, 25, 1979, No.1, pp.99-101.
1 fig.

This is one of a series of three instructional articles concerning the use of solar energy in teaching. It concerns the making of a methane digester. The author, in the form of a conversation with pupils, acquaints the reader with the principle of methane formation in an anaerobic environment. For the experiment, macromolecular substances of organic origin are used, which are able to bond solar energy /manure particles, bits of newsprint paper or grass/. These substances are submerged in water in a closed vessel so that the desintegration caused by bacteria takes place in an anaerobic manner. Besides a detailed analysis of the described experiment, the article also contains another two alternatives. In both of them the mixture of organic particles is heated to a temperature of 30-35°C; they differ in the method used to capture the gaseous substances.

10.92

574. TABOGA, L.: Construction of a simple respirometer.

The American Biology Teacher, 41, 1979, No.6, pp.358-360 .
1 fig.

The author describes the design and method of use of a very simple respirometer, i.e. a device for measuring the consumption of oxygen by an organism. It is made of two basic units, one of which is the respirometer proper and the second serves as a thermo-barometer and evens out changes in atmospherical pressure and temperature in the course of the experiment. The structure and function of both parts is described in detail. Before the experiment the experimental animal /for instance a laboratory mouse/ is placed in a measurement vessel and allowed to adjust to the new environment. The temperature in the measurement vessel should, during the course of two hours, remain without change. In view of the fact that the whole device is, in fact, a manometer, the respirometer can also be used for measurements in other experiments of the metabolic exchange of gaseous substances between an organism and its environment, as well as for determining the catalytical activity of the lungs and tissue homogenates.

10.92

575. WEINTRAUB, J.J.: An efficient transfere device for fruit flies /Drosophila/.

The American Biology Teacher, 42, 1980, No.7, pp.428-429.
2 figs.

The author has made a simple but very effective device for transfering fruit flies used in various laboratory experimants. Such transfers tend to be difficult in view of the high and frequent dissemination of these flies. The device is an extention piece made of plexi-glass or some other plastic, which is placed on the jar with the fly population. Through holes in the extention the flies can be transfered into another jar without being able to escape. The author includes a drawing of the extention piece and its size, together with a description of how to make this piece of inexpensive and effective equippment.

10.93

576. CHASTON, S.H.H.: Acid base scales.

Australian Science Teachers Journal, 24, 1978, No.1, pp. 98-101.
5 figs.

The article describes an acid-base scale in the form of a single-dimension graphical representation, which has some advantages in comparison to two dimensional models, because it is easier to make. It can be used for determining the direction and scope of the spontaneous transmission of protons in pH reactions and the determination of pH solutions of weak acids or bases. The article describes and analyses five examples. The first concerns the conditions existing in a hydrogen fluoride solution and especially the position of three acid-base pairs on the pH scale. Another example is a scale for a mixture of sodium floride and sodium nitrate. Also examples of scales for an ammonium floride solution, a sodium hydrocarbonate solution and an ammonium hydrosulphide solution. Besides citing the scales, the author also provides a detailed explanation on the basic chemical reactions which take place for achieving a specific pH level.

10.94

577. **ANKNEY**, P.: Scaling: A concrete approach for introducing the concept.

The Australian Science Teachers Journal, 24, 1978, No. 2, pp.128-130.
3 figs.

Making a model according to scale means that reduction or enlargement takes place equally for all components of a given object or image. The introductory part of the topic thus poses few problems for students. The author here acquaints the reader with some more complex methods of enlarging or reducing. The first assignment is the measurement of a person from a distance with the aid of a piece of rope. Besides height, other measurements can be taken /width of shoulders, arm span, etc./. Another assignement requires students to carry out a reduction at a ration different from that divisible by two.The method is derived from geometrical theorems concerning the similarity of triangles with the same angles. The final method of scaling uses a piece of rope and a brick wall. The rope intersects horizontaly the joints between the 1st to 6th line of bricks in regular intervals.

10.95

578. ANKNEY, P.: Classroom planetarium: a low-cost introductional aid to help students learn about the night sky.

The Australian Science Teachers Journal, 24, 1978, No.2, pp.126-128.
1 fig.

An explanation of the position of stellar bodies and the movement of the planets is difficult, among others, because when classes take place, the stars are not visible. Students usually are not capable of an application of what they have learnt, when faced with the actual heavens at night. For this reason the author describes a demonstrative teaching aid - called a class planetarium - and how it can be used during class work. This is a three deminsional model of the night sky, which can be made by the students themselves. The foundation of the model is formed by a domelike area made of paper stiffened with metal bands which is freely hung by its center from the ceiling. On the inside it is painted black, with white stellar bodies. Its north should coicide with the actual north. Individual stellar bodies are not initially shown, but rather painted in gradually, as the students learn about them. Besides stars and constellations also those planets which are visible from Earth are gradually painted in.

10.95

579. COLLINS, D.D.: Video systems in biology teaching.

The American Biology Teacher, 41, 1979, No.8, pp.501-502.

The author discusses opportunities for using video cassette recordings in biology instruction. These include recordings of TV programmes, of educational films or recorded lessons. A combination of TV camera and a video tape recorder make it possible to demonstrate difficult experiments, where incorrect steps in the experiment can subsequently be set right, etc. One of the most important applications of vide-tapes is the forming of auxilliary recordings for use within the framework of other technical equippment during field excercises and a source for making colour slides, film loops and tape recordings.

10.95

580. SHIL_OV, V.F.: Podbor i razmeshcheniye proyektsionnoy apparaturi v kabinete biologii. /The selection and placing of a projection device in the biology study room in a school./

Biologiya v shkole, 54, 1980, No.2, p.43.

The author cites equations for the calculation of the best place for placing projection devices in a classroom. It should be placed in such a way that it:

1/ assures a high quality image of the available audio-visual teaching media;

2/ maintains all rules concerning sight hygiene;

3/ economizes in the use of expensive state property.

The author discusses the maximum distance between pupils and the screen for projections and compares the light flow of the projector in relation to its optimum distance from the screen.

10.95

581. BÁGYI, I.: Az írásvetítõ felhasználási lehetõségei biológiaórákon. / The use of an overhead projector in biology lessons/.
A biológia tanítása, 19, 1980, No.4, pp.105-108.
2 figs.

The article discuss the importance of demonstrative instruction in the teaching and education process of biology instruction. An overhead projector is a very good medium in this context. During the last 6 to 7 years its use in schools has changed to a great extent. The author describes various methods of using an overhead projector; it can be used in place of a blackboard, for the verification of pupils´ knowledge, for experiments carried out by pupils and for achieving a differentiated approach to individual pupils. Most important, however, is the use of an overhead projector in connection with transparencies. With the help of various pictures, various types of transparencies are discussed and their positive aspects stressed.

Making transparencies is rather demanding as far as time is concerned. The commercial making of transparencies might contribute to making a teacher´s work more effective.

10.95

582. FRIMMEL, R.: Wie man Schülermikroskop leistungsfähiger machen kann. /How to improve the effective use of school microscopes./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 2, pp.58-59.

On the basis of the two years experience of supervising student practical excercises which are part of the basic biology course in Bavarian general education secondary schools, and in view of the number of microscopes schools have available, the author makes suggestions for inexpensive methods of improving the effectiveness of the available microscopes. These include improvements in the field of view of the microscope, the use of slanted sources of light for stressing surface structures in the objects being observed /for instance the ducts on the underside of a leaf/, making an inexpensive polarisation device, etc. For observations under slanted light the author recommends removing the surface of the leaf with the ducts, with a solution of colloid in ether, which after evaporation can be pulled off the leaf and the negative imprint observed. For the observation of crystals and crystalic specimens the author recommends a solution of resorcine in di-ethylether, sulphur in carbon disulphide and vitamin C in water. A polarisation device can be made with a polarisation foil from which a circle the size of the filter holder is cut and a second smaller one is placed in the eyepiece. The eyepiece is then rotated during observation in the polarised light, where grains of starch from fresh potatoes or crystals of resorcine or ascorbic acid can be observed.

10.96

583. MROWCA, C.: Jak poprawić jakość obrazu mikroskopowego. /How to improve the quality of microscopical images./

Biologia w szkole, 11, 1980, No.5, p.306.
1 fig.

The author discusses the problem of achieving a better quality microscope image. In school this problem is usually aggrevated by insufficient lighting of the specimen to be examined. Daylight is usually insufficient and is in any case difficult to focus while artificial illumination is found in the wrong place. For this reason the author has designed a special lamp to use for microscopy, which 8th class pupils can make themselves in their shopwork period. The price of the needed materials is approximately 100 zlotys. The inside of the lamp is painted white. There is a drawing of the lamp design. The author is a teacher at the basic school in Tymbark.

10.96

584. GOODWYN, R.D. - ROWE, A.B.: Construction of a 2.5 m diameter fibreglass solar reflector.

The Australian Science Teachers Journal, 26, 1980, No.1, pp.96-104.
5 figs., 4 diagrams.

The authors describe a do-it-yourself construction of a solar reflector for school purposes. It is composed of a paraboloid 2.5 m in diameter or 1.5 m in diameter. Both size are suitable for various practical experiments with solar energy, which is now very popular in view of the energy crisis. The smaller of the reflectors will produce a temeprature of 70°C, the larger one up to 100°C. Various experiments can be carried out at both temperatures,which the authors describe on the basis of their own experience.

10.97
585. GAC, T.: Wyposażenie pracowni biologicznej. /Furnishings for a biology workroom./

Biologia w szkole, 33, 1980, No.1, pp.47-51.
9 figs.

The large scale production of teaching media for all teaching subjects has been unified, so that the furnishings and equipment which schools have at their disposal has been recently greatly improved. In 1975 the project of an ideal biology workroom was designed: school administrations, teacher training colleges, teachers, experts in the didactics of biology, architects, interior decorators, experts in hygiene and school supervisors all served as consultants for the project. A prototype was made in 1977 and mass production will begin soon. One of the first workrooms built is located at the Basic school No.250 in Warsaw. The author of the article describes in detail the workroom, which has areas for the group or individual work of pupils, for the projection of slides, transparencies, films, phasegrams, areas for the cultivation of plants and breeding of small animals. Also the biology stock room attached to the workroom is described and the furniture in both rooms, tools, scales, aquariums microscopes, etc. found in them. The biology workroom has furnishings which make it possible to organise small scale exhibitions of natural objects.

10.97

586. PULAJTÁR, P.: Odborná učebňa - účinný prostriedok modernizácie vyučovania biológie. /A specialized classroom - an effective medium for the modernisation of biology teaching./

Přírodní vědy ve škole, 31, 1979/80, No.6, pp.210-212. 4 figs.

The article is an excerption from a pedagogical reading, which received a second prize within the framework of a competition in Czechoslovakia. The author describes the selection and furnishings of a biology classroom and how various technical installations were carried out to equip it with various aids and technical teaching media.

10.97

587. KIRICHENKO, P.A.: Zalog uspeshnoy raboti. /A guarantee of successful work./

Biologiya v shkole, 54, 1980, No.3, pp.42-44.

The author describes the theoretical aspects and practical solutions to furnishing a biology classroom and stockroom where all implements and equipment are stored. The partition between the classroom and stockroom is formed by a row of cupboards and closets. At the front of the classroom, besides a blackboard, there is a projection screen and holders for wall pictures. One of the walls is devoted to a survey of the phylogeny of plants and animals. The furnishings are very simple and functional; the main aesthetic decoration is a collection of indoor plants /useful for botany teaching/ and a functionally useful aquarium. The stockroom has a detailed card file of all teaching aids, films which are on loan from a municipal lending service, microscopy specimens and a file of cards for each teaching lesson, which contains questions for testing pupils, a bibliography of methodological and specialized literature and an outline of the subject-matter to be taught.

10.97

588. SHILOV, V.F.: Kompleksniy kabinet yestestvoznaniya dlya selskoy shkoly. /A complex natural science classroom in a rural school./

Biologiya v shkole, 54, 1980, No.3, pp.38-42.
8 figs.

In eight-year rural schools there are usually no parallel classes in a single grade and thus organising a specialized classroom tends to be quite difficult /at present 33% of schools have geological classrooms, 13% have one for chemistry, 23% for physics/. A solution could be the organization of a complex nature studies classroom, which would include equipment and other objects for teaching the natural sciences, biology, chemistry, physics and also extra-curricula activities could take place there. The above cited subjects often use the same or similar methods of work, similar equipment, sources of energy, etc. The article describes in detail the furnishings of such a classroom - which should be made up of work tables for 24 pupils and have 2 storerooms -one for technical media in general and material needed for physics, while the other might hold objects needed for biology and chemistry teaching . In this form it is possible to integrate the teaching media of various subjects so that their total number /854/ is 35% less than those used in other rural schools.

10.98

589. MOLDSWORTH, D.: Simulations of school chemistry experiments.

The Australian Science Teachers Journal, 24, 1978, No. 1, pp.101-103.
1 tab.

At present mini-calculators are increasingly more often used in class, both by teachers and students. In Australia an instrument has been produced which contains 36 steps, which is suitable for the simulation of chemical experiments. The calculator has a memory and is able to deal with arithemic operations, logarithms, raising to a power, goniometrical functions, brackets and inverse values. It is manipulated manually. Of the experiments which it can simulate, the author describes the titration of strong acids and bases, buffers, the atomic spectrum of hydrogen and radioactive decay. He provides a brief characteristic of the experiments and their possible alternatives. A computer type programme is described and the main algorithm for the calculation of pH. The article also contains a table which provides a survey of computer programmes suitable for the simulation of chemical experiments.

10.98

590. SMYTHE, R. - LOVATT, K.F.: *Applications of the computer in biology teaching; computer assisted and computer managed learning.*

Journal of Biological Education, 13, 1979, No.3, pp. 207-220.
2 tabs.

The constantly increasing use of computers in biology teaching is summed up in this article from a theoretical point of view in connection with the increasing use of computers in the education process in general. The authors discuss above all "computer assisted learning" with special stress on biology; they cite examples of materials which are available for biology. Also "computer managed learning" is discussed extensively with special stress on the Havering project. In the tables attached to the article, brief descriptions and names of individual programs are cited and the inputs and outputs of the GLENDRIFT programme, which is one of the computer managed learning methods; it enables the student to understand the foundations of genetic drift.

11.2

591. TSUZMER, A.M.: *Nekotoriye puti obespecheniya effektivnosti uroka.* /Some methods of increasing the effectiveness of a teaching lesson./

Biologiya v shkole, 54, 1980, No.4, pp.17-25.

The author, in an attempt to precisely formulate the aims of a lesson so that it reflects its key points, does so by defining the position of a teaching lesson in the whole system of biology teaching and by defining basic general biological notions developed by the lesson. The article also stresses the importance of combining learning with practical problems, the rational structure of the lesson /for instance the verification of pupils' knowledge by the use of items from a herbarium, slides, possibly microscopical specimens, simple experiments done by pupils, etc./. When new subject-matter is being taught, the activation of cognitive activities of the pupils are most important. This requires the use of a problem approach, the independent observation of various natural objects, the active use of all types of ostensiveness, extensive work with the textbook and other books, various approaches to the systematization of knowledge /the relation of a given subject to those that preceded it, the formulation of conclusions by one of the pupils, taking notes etc./. Also when the reinforcement of newly learnt subject-matter is the aim of a lesson it is possible to find non-traditional effective approaches -for instance including into the lesson other examples than those used when the subject was first explained, properly chosen homework, etc. In conclusion the author provides a survey of other aspects which should be taken into account in efforts to make teaching more effective /the availability of various materials, motivation methods of presentation, etc./.

11.2

592. LEONTYEVA, M.R.: Za effektivnost kazhdogo uroka. /For the effectiveness of every teaching lesson./
Biologiya v shkole, 54, 1980, No.4, pp.3-5.

Increasing the effectiveness of every teaching lesson is an important task of all educational collectives and all teachers. In this editorial the author discusses the resolution of the Central Committee of the Communist Party of the Soviet Union and the Council of Ministers of the USSR called "For the further improvement of the teaching and education of pupils in general education schools and their training for jobs". Also in biology teaching the basis for an effective utilization of lessons is a precise definition of the main components of each lesson and its content and a through preparation of its structure and course, as well as the selection of optimum methods and procedures so that each lesson develops the creative /productive/ activity of pupils. It is important to maintain the ostensive nature of lessons, a differentiated approach to pupils and to organize various independent activities by pupils, including work with the textbook, optimum repetition, etc. What is essential is the forming in each lesson of the correct creative atmosphere based on the creative activities of the teacher and supported by the emotional interest of the pupil in achieving good results in school work as a whole.

11.21

593. BEASLEY, W.: Analyzing laboratory performance - what do we really measure ?

The Australian Science Teachers Journal, 26, 1980, No.1, pp.69-70.

An important aspect of instruction in a scientific discipline is the stress placed on laboratory excercises and the reliability of data obtained in experiments. The purpose of laboratory excercises is the development of the students' mental and motor skills, his ability to observe, interpret data and his ability to plan and carry out experiments. The article discusses the practical aspects of these demands upon the student and his abilities, on the basis of specific examples of laboratory work.

11.21

594. BECKMANN, H.: Zur Durchführung obligatorischer mikroskopischer Schülerübungen. /Concerning microscopy excercises by pupils./

Biologie in der Schule, 29, 1980, No.6, pp.248-250.

Microscopy done in the 7th and 9th classes is an important topic. The assignments given to pupils should be verified and this is the subject-matter upon which the author concentrates in this article. To assure an objective assessment of the pupils the author first provides a list of objects suitable for microscopy in the 7th and 9th classes. He makes this more specific on the basis of the example of chloroplasts /for the 7th class/ where during microscopy the pupils are rewarded points for prepering the specimen, setting the microscope, making a drawing of what is seen and assessing what has been observed.

11.21

595. BULÍŘOVÁ, S.: Laboratorní práce v 5. ročníku základní školy /experimentální/. /Laboratory work in the 5th class of basic school /experimental/./

Přírodní vědy ve škole, 31, 1979/80, No.10, pp.370-371.

The author cites her own experiences with practical excercises in the 5th class of basic school. She points to the most often made errors on the part of the pupils and how to avoid such errors.

11.21

596. CASE, C.L.: Impact of auto-tutorial laboratory instruction in biology on student attitudes.

The American Biology Teacher, 42, 1980, No.2, pp.121-123 .
2 figs.

Auto-tutorial laboratory instruction allows students as much time as they need for their assignment, without being rushed. They are thus able to develop the discipline which is needed for successful work in school. The author has prepared for this purpose methodological procedures and a mini-course in carrying out laboratory assignments, thus making it possible for the students to do their work without supervision and advice from a teacher and to continue the assignment in their free time either individually or in groups.

11.21

597. CULLIMORE, D.R. - PIPE, A.E.: Studying the activities of microorganisms in soil using slides.

Journal of Biological Education, 14, 1980, No.3, pp. 213-218.
3 figs.

The soil is the domain of many types of plants, animals and also micro-organisms. So far no satisfactory technique has been developed for the utilisation of soil in this context. This can be improved by a laboratory form of investigation, which from a methodological point of view should have specific requirements, which must be respected to assure success. The authors describe such a method, which they used at the University at Regina. In view of its simplicity this method is suitable for secondary school students and concerns above all work with a microscope.

11.21

598. DORAN, R.L.: Assessing the outcome of science laboratory activities.

Science Education, 62, 1978, No.3, pp.401-409.

Laboratory work is not only an indispensible part of the work of any natural scientist, but also forms the foundation for teaching the natural sciences in schools. In the article the author attempts to define the cognitive, emotional and psychomotor foundations important for laboratory work in the natural sciences. An assessment of the conclusions drawn from laboratory work can strongly influence the future development of the curriculum and syllabus. The author asseses the topics assigned in laboratory excercises and distinguishes several styles used for determining the skills of students in the laboratory. A number of various authors are quoted who deal with similar or partial problems. Basic methods for assessing the work of students in the laboratory include direct observation, written tests, evaluation of experimental data obtained and manipulation excercises.

11.21

599. HUMMER, P.J.: Determining the population size of pond phytoplankton.

The American Biology Teacher, 42, 1980, No.9, pp.545-548.
6 figs.

Changes in the colour or degree of turbidity of pond water are connected with the phytoplankton population. Hence students can discover new worlds by the microscopical study of pond waters. The author here provides a practical description of microscopy techniques for studying samples of pond water in the laboratory for determining species of phytoplankton and for other observations. The water brought to the laboratory in test tubes is first placed in a centrifuge; after the water has been removed, further classification must be done under a microscope. The author adds various assignements which can be given to students.

11.21

600. JUNGWIRTH - DREYFUS - URIEL - BROZA: How to realize the educational potential of laboratory work in genetics.

Journal of Biological Education, 14, 1980, No.1, pp. 29-35.
1 fig.

Because teachers are often not acquainted with the educational principles involved in specific teaching forms, the article offers comments which concern laboratory work in genetics. The authors discuss the scientific background to these excercises and deal in detail with the methodology of experiments in classical genetics in the context of educational principles in general and their application to the work in question specifically. The role of the teacher is stressed.

11.21

601. KADIROV, A. - MAMADZHANOV, Y.: Laboratorno-prakticheskata rabota pri uzuchăvane na dzhdovniya chervey. /Practical laboratory work concerning the topic on the earthworm./ Biologiya i khimiya, 23, 1980, No.3, pp.32-37.

The author reports on a research project which aimed at determining the effectiveness of practical excercises for developing pupils' knowledge in physiology; two sixth classes were studied, one of which formed the experimental group and the other the control group.

In the experimental class the external structure of a earthworm's body and its way of life were studied on the basis of practical activities directly with a living object, while in the control class this knowledge was transmitted in the form of discussions, demonstrations and explanations.

The outcome of examinations indicated that the practical form of gaining knowledge is more effective than verbal forms of instruction.

11.21

602. KOYAMA, K.: A holistic approach to water ecology. The American Biology Teacher, 42, 1980, No.2, pp.116-117 .

There is not enough fresh water throughout the world to tolerate squandering it. Water reservoirs are being built and stress is placed on economizing water. The article deals with a course for teachers on specific problems of water ecology, including laboratory work, which deal with the biotic and abiotic study of water, water flows, etc. Water ecology can contribute to the greater knowledge of the environment and help to pass this knowledge on to students.

11.21

603. LAWSON, A.E.: Designing biology, laboratory and field experiences for thinking.

The American Biology Teacher, 41, 1979, No.3, pp.183-184,191.

The development of thinking in children and adolescents requires on the one hand the acquisition of practical experiences and on the other hand opportunities for talking, discussions and the expression of thoughts. The author in the article describes opportunities for supporting the thinking process in students during laboratory and field work. The example cited is from ecology. 4 alternatives are offered to the reader for the organisation of such occasions. These various alternatives are analysed, especially from the point of view of the students' independent thinking. Another part of the article discusses suggestions for new or adaptations of existing laboratory and field excercises so that the student is forced to think as much as possible.

11.21

604. LUNETTA-HOLSTEIN-GIDDINGS: Evaluating science laboratory skills.

The Science Teacher, 48, 1981, No.1, pp.22-25.
2 figs.

The authors consider laboratory work to be the cornerstone of biology and chemistry teaching and point out that students are not sufficiently well prepered to use the various techniques required of them in laboratory work. They have therefore prepared a syllabus for teaching laboratory skills, which is divided into four parts: 1. planning and designing an experiment, 2. implementation of various teachniques, 3. analysis and explanantions, 4. application to specific assignment. The authors have also developed a system for assessing students on the basis of a points system. On the basis of this system the assessment of the acquisition of laboratory skills in secondary school approaches that of a college level.

11.21

605. MANTEUFFEL, M.S. - CAETSCH, W.S.: The anatomy of student investigation in a general biology course.

The American Biology Teacher, 42, 1980, No.8, pp.462-467.
3 figs.

The authors provide an analysis of the increasingly frequent method of independent research work done by students in laboratories, where they work without the supervision of a teacher and submit a report on their findings. The project reported on has indicated that students are not yet able to do independent laboratory work /in secondary school/. There are 6 various factors which influence the quality of this method: the environment, the approach of the students to the assignment, the course and its quality, the quality of instruction, available resources and demands made upon the students by the teacher. The role of each of these factors is analysed in detail.

11.21

606. PORTER, M.L.: Meat tenderizer, jello and jellyfish stings.

The American Biology Teacher, 41, 1979, No.5, pp.304-305.

The article describes laboratory excercises in biology where the pupils become acquainted with substances they encounter in every day life - meat tenderizer and jello. The teacher first acquaints students with safety rules /the use of a Bunsen burner, the open end of a test tube should not be directed towards any person/ and with the general characteristics of both substances. Meat tenderizer contains above all the enzyme papain. Jello is in fact soluble animal protein. The article describes in detail how to procede in the experiments. On the first day the students dissolve the jello in hot water and separately dissolve a mixture of jello and meat tenderizer. On the next day they observe the differences between both substances and answer questions.

11.21

607. QUASIGROOCH, G.: Anschaulicher Unterricht. Kennübung: Getreidekörner. /Demonstrative teaching. An excercise in cognition: cereal grains./
Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.7, pp.209-212.
6 figs., 1 tab.

The author has found that not even in rural schools are pupils able to recognize individual kinds of cereals according to their spikes and grains. He therefore suggests a laboratory excercise devoted to distinguishing various kinds of cereals. In conclusion of the excercise the pupils should sit for a test, to make sure they have learnt the topic. 5 different pictures drawn on the board can help the pupils. This excercise is intended for the 7th class and is called "From grains to bread". Besides samples of spikes and grains, only the drawings on the blackboard and an overhead projector are needed.

11.21

608. RICHTER, L.: Erfahrungen zum Mikroskopieren /in Klasse 6/. /Experiences with microscopy in the 6th class./
Biologie in der Schule, 29, 1980, No.12, pp.509-511.

Microscopy begins in the 6th class. The author divides this subject-matter into three parts - learning to use a microscope, using a microscope in studying invertebrates and the improvement of mounting techniques. This article concerns the first two parts. When learning how to use a microscope, the pupils are given various assignments described by the author. When teaching about invertebrates, the author cites various suitable objects for observation from the phyllum Coelenterata, the phyllum Plathelminthes and the classes of crustanceans and insects.

11.21

609. SMALL, J.W.Jr. - EDWARDS, K.L.: Simulating Drosophila genetics with the computer.

The American Biology Teacher, 41, 1979, No.9, pp.219-225.
5 tab.

The principles of Mendelian genetics form the foundation of all modern biology courses. Here the authors acquaint the reader with some methods they have developed for laboratory excercises. They use a computer model of the genetic system of the Drosophila fly. The aim of the project is to help the student underatand Mendel´s laws. The cited model makes it possible to carry out a "breeding" program and to solve practical genetic problems in a very brief time. The program is called SIMPFLY II and uses the BASIC-PLUS computer language for a PDP II/40 machine. The article describes the method of using the program; a survey of its characteristics and relevant codes is added together with samples of some model problems and how they can be solved.

11.21

610. STORY, L.E.: An aquatic community comes to the classroom.

The American Biology Teacher, 41, 1979, No.6, pp.361-362. 1 fig.

The article describes a basic laboratory excercise in which an aquatic community is studied. This basic type excercise can be adapted to the needs of various types of schools. The aim of the excercise is to determine ecological relations in an aquatic community. The method used is a controlled study. During the excercise the students learn how to observe, classify,accumulate data, measure, determine variables and to interpret acquired data. Each student works with a half litre sample of water from a pond, lake, swimming pool, river, etc. Fallen leaves, garden soil, etc. can serve as solid components of the "ecosystem". During a specific span of time the student records every day various physical data /such as temeprature, pH, oxygen content/, as well as microscopical observations of the living organisms. All data is then processes in the form of graphs and histograms.

11.22

611. ARNOLD, R.M.: Railroad lines as study sites in plant biology.

The American Biology Teacher, 41, 1979, No.9, pp.548-551. 4 figs.

The article describes a field excercise in botany which makes us of railroad lines which are little used or have ceased to be in operation entirely. From an ecological point of view the tracks themselves and the right of way are very interesting. There are several factors at work here: the low humidity and moisture of the soil cause the proliferation of xerophilous plants. On tracks still in use, plants which have a low growth are at an ecological advantage. A passing train facilitates the dissemination of seeds to a wider area. The best type of tracks for such excercises are those where trains pass once or twice a day up to those where trains pass once a month. Before the excursion the students should learn to identify the most often found species of plants and to distinguish those which are indigenous to the area and those which have arrived only recently. Once at the site, the ground can be divided into 1 meter wide bands; the students record all species found within their band. The findings are then written up into reports and diagrams. The aim is to find various mutual relationships between the incidence of a plant, the dissemination of its seed or fruit by the wind, etc.

11.22

612. BRYANT, T.N. - SMITH, J.E.: A teaching excercise for the identification of bacteria using an interactive computer program.

Journal of Biological Education, 13, 1979, No.1, pp. 58-66.
2 tabs.

An interactive computer program is described, which can be used in excercises for the determination of bacteria. An unknown bacterium is given to the student, who has available a list of possible species and a list of identification tests which can be used. The task of the student is to determine correctly the given specie in the shortest possible time. In the introduction to the article the authors describe the theoretical foundations and main principles of the program and quote a complete list of the possible 71 species of bacteria. The main part of the article contains a description of the excercise itself and a list of tests to determine the bacteria. An appendix provides, as an example, a filled-in questionnaire for the computer program.

11.22
613. BURKE, D.D.: A programmed approach to investigative laboratories in microbiology.

The American Biology Teacher, 41, 1979, No. 8, pp. 484-486, 491.
1 tab.

The author describes the use of a model modified for the purpose of a laboratory study excercise, which he uses in his own classwork. The program is an introduction to experimental microbiology called MICRO 101, which requires 8 weeks. In place of the traditional method of instruction, it provides a numer of opportunities to combine previously acquired theoretical knowledge and practical skills and also to participate directly in a research project and thus to learn correct methods of scientific work. The program offers four topics: the production of antibiotics, the preservation of food, the decomposition of potatos /as a pathogene model/, and the fermentation of grapes. As an example the article describes in detail the structure of the first topic. Each research assignment takes three weeks and is divided into various levels according to the difficulty of the assignment. The student first becomes acquainted with all components of the assignment, then choses the optimum type of experiment and then designs, carries out and assesses the chosen method. In the final part of the article the author assesses experiences with the use of the various topics cited above.

11.22
614. COMBER, D.H.: The laboratory culture of Eucyclops agilis /Koch/ and suggestions for its use in practical work.

Journal of Biological Education, 13, 1979, No.2, pp. 83-87.
5 figs.

The article describes a method for developing laboratory colonies of the copepoda Eucyclops agilis with the aid of Euglena. Besides details concerning the life cycle of these animals, also suggestions for various laboratory school work are provided. The program is intended for 16 to 18 year old secondary school students. The copepodas can be cultivated in a Petri dish, which has first been sterilized. Pond water which has been filtered and sterilized in an autoclave at 121°C for 15 minutes can serve as a medium. The temperature of the medium should be maintained at 20°C and illuminated for 16 hours at 200-400 lux. Students can carry out experiments with food, observe the life cycle of the copepodas and the factors which influence these cycles.

11.22

615. FERRON, W.: Genetic regulation of enzyme activity: An excercise in molecular genetics.

The American Biology Teacher, 41, 1979, No.6, pp. 355-357.
3 figs., 1 tab.

At present every genetics textbook contains a detailed description of protein synthesis, controlled by DNA. This article deals with only a single aspect of this problem - the relation between DNA sequence and functional enzyme activity. One of the main functions of enzymes is the combining of small molecules, the division of existing molecules and their recombination. Each enzyme has its "form" with which it is linked. The author describes this linkage between an enzyme and the form of its regulation. Another part of the article concerns DNA mutations and especially those based on the substitution of one nucleic acid by another during the replication of DNA. The author cites the example of glutamic acid and its transformation into valinic acid in the 6th place of a B chain in haemoglobin. The article also contains very clear illustrations and an outline of the codes used for the forming of codons in m-RNA.

11.22

616. FRONĚK, J.: K pojetí chemicko-biologického praktika na základní škole. /Concerning the concept of a biology and chemistry practical excercise in basic school./

Přírodní vědy ve škole, 31, 1979/80, No.4, pp.132-133.

The main content of practical excercises in biology and chemistry are experiments, observations and the training of selected work procedures. The basis of the concept is formed by the theoretical and practical methods used in chemistry, but attention is also paid to work procedures used in other natural science disciplines, especially biology and geology.

11.22

617. HAMILTON, T.R.: Swordtail fish as subjects for animal behaviour studies.

The American Biology Teacher, 41, 1979, No.7, pp.426-430.
3 figs., 2 tabs.

The article describes a topic for a laboratory excercise in ethology. The swordtail fish /Xiphophorus helleri/ is especially suitable for this purpose. The students can easily follow its aggressive and reproduction behaviour. In the introductory part the author acquaints the reader with the origins and biology of the species, discusses the possibility of cross-breeding it, its various colour mutations, and the possibility of breeding the fish in a classroom. He describes in detail the mating and copulation behaviour of a pair of swordtail fish, where 6 different stages can be distinguished. Aggressive behaviour can be observed by the students on adult males, first in separate aquariums and then when they are put together. The article describes the methodology of the experiment, how to keep records of the project and how to carry out the final assessment.

11.22

618. JURČÁK, J.: Begónie korálová jako vhodný zdroj materiálu pro praktické cvičení z botaniky II.
/The coral begonia as suitable material for practical excercises in botany II./
Přírodní vědy ve škole, 31, 1979/80, No.4, pp.126-129.
9 figs.

The coral begonia can be used for making horizontal cuts through the stem. Another suggestion concerns making, observing and drawing a cross section of the flower stem, the leaf petiole and leaf blade, observing the lower epidermis of the leaf blade, the course and termination of vein bundles in the leaf of the floral envelope and observation of pollen grains. Instructions for these observations are given in detail and outlines of the drawings of the objects are provided.

11.22

619. JURČÁK, J.: Begonie korálová jako vhodný zdroj materiálu pro praktická cvičení z botaniky I. /The coral begonia as suitable material for practical excercises in botany I./
Přírodní vědy ve škole, 31, 1979/80, No.3, pp.90-92.
5 figs.

The coral begonia, which can easily be cultivated in conditions provided by a classroom, can serve as a suitable source of material for practical excercises in plant anatomy. The author provides a brief characteristic of the plant and provides various suggestions for assignments in microscopy, including the making of specimens, descriptions and

and drawing the objects observed. For each such assignment the author also indicates the conclusions to be made and shows how these assignments can be used as material for problem teaching.

11.22

620. KALISCH, W.E.: Drosophila: Eine Testkreuzung zur Analyse der Genwirkung und der chromosomalen Zuordnung von Mutationen . /The fruit fly: test cross breeding for the purpose of analysis of the effects of genes and chromosomal sequence of mutations./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.2, pp.99-105. 3 figs., 1 tab.

By comparing the phenotypes of generations P and F_1 in test cross breeding with unknown mutations of the classical object of genetic experiments, the fruit fly /Drosophila melanogaster/, a pupil can, on the basis of a knowledge of Mendel's laws, determine independent and on the basis of previously set questions the effect of genes on the determination of the combination of chromosomes in mutations and also the characteristics of the genotypes in the P and F_1 generation. The work is designed as an experimental study for the upper classes of secondary school. In the experiment two test strains of the fruit fly with phenotypical deviations are cross bred. The breeding of the fruit flies is described, especially both strains used for cross breeding, the F_1 generation is assessed and the findings are analysed. Questions are cited which lead pupils to conclude the experimental work. The variables which are followed include the colour of eyes, the shape of the eyes, the shape of the Xasta and Curly wings, the halteres /balancers/ and the number of individual mutations.

11.22

621. MADRAZO, G.M.Jr. - HOUNSHELL, P.B.: Using fungi /the almost forgotten organism/ in the classroom.

The American Biology Teacher, 41, 1979, No.9, pp. 530-533.
1 fig.

Fungi are a group of organisms which are very neglected in biology teaching in secondary schools. Teachers often leave them out and many textbooks also hardly mention them or pay very little attention to them. The authors consider this to be serious shortcoming of the syllabus, because fungi offer a number of interesting topics for teaching. Of the non-pathogenic fungi the article recommends using yeast, Pitobolus, Rhizopus, Penicillinum, Saprolegnia, Sordaria, Aspergillus, Neurospora and Phycomyces. The authors describe a laboratory excercise where students observe the flow of protoplasma in the cells of the genus Rhisopus. Besides this, students can study environmental problems, the problem of fungi life cycles, pH levels, the role of fungi for man, etc.

11.22

622. OSTROVSKY,D.S. - YURKIEWICZ, W.J.: A simple in vitro demonstration of muscle concentration.

The American Biology Teacher, 41, 1979, No.8, p.501.

The authors describe an experiment in which it is possible to demonstrate muscle concentration in vitro during laboratory excercises in physiology. Mouse or rat muscles are used which are placed in 0.6 M solution of KCl and homogenized. The substance thus obtained contains actin, myosin and Ca^{2+} ions, but ATP must be added as a source of energy. This is available in the form of a ready made substance /Sigma/ and is added only to one part of the homogenate. The fibres of polymerised actin and myosin are transformed into actomyosin and after the ATP has been added they contract in a marked and vigorous manner. The authors also cite other topics for experiments with muscle fibre.

11.22

623. PERLEY, J.E. - GLASS, A.D.M.: Cytoplasmic streaming and ion transport: A laboratory excercise which tests a longstanding botanical concept.

Journal of Biological Education, 13, 1979, No.3, pp. 199-203.
1 fig.

The potential inhibitiory effects of Cytocholamine B on cytoplasmic streaming provide a suitable method for studying often doubtful but longstanding concepts in plant physiology on the basis of valuable laboratory experience. Observing cyclosis in root cells and the flow of ions in xylene exudates enables students to evaluate the hypothesis concerning the functional relation between these two processes. Tomato seeds have been chosen for the experiments, in which the streaming of potassium ions is studied.

11.22

624. RAHAM, R.G.: Stalking the wild diatom.

The American Biology Teacher, 41, 1979, No.8, pp. 460-465.

9 figs.

A very interesting subject for practical excercises in biology is a study of diatoms. In the article the author provides a basic characteristic of the structure of their bodies, instructions on how to collect them and suggestions for making permanent specimens and for observing living fresh water diatoms. From the point of view of systematics, diatoms belong to the group of algae called Bacillariophyta. In their cell walls yellow and red pigments predominate over chlorophyll and the cell walls are impregnated with silica. Diatoms form two orders: Centrales and Peunales. The fresh water kind can be collected in stagnant waters attached to other plants or freely floating on the water. In flowing waters they can be found in similar sites. In large lakes they can easily be caught in a plankton net. In class either permanent or temporary mounted specimens can be made and the students can observe the structure of their bodies, their movement, method of reproduction, reaction to light, etc. The article also has a number of photographs and clear drawings.

11.22
625. ROARK, O.F.: Relating gaseous exchange with varying temperatures in Rana pipiens.

The American Biology Teacher, 41, 1979, No.2, pp. 91-93.
1 fig., 1 tab.

The article describes a laboratory excercise which concerns respiration in amphibians, especially frogs. The excercise is intended for 1st year students who attend classes in human physiology. The basic hypothesis of the excercise is that in poikilothermic animals the amount of oxygen intake increases with increasing temperature. The students observe the number of throat movements in the frog, which is one of the means of respiration in this animal, as well as the number of exhalations and inhalations per minute at a given temperature. The findings are written in a graph. The range of temperature studied was 5 - 30°C. The students worked in groups: either they observed the frog gradually during various temperatures or each group recorded data at a specific temperature and the findings were then compared.

11.22
626. ŠLÉGL, J.: Ekologie edafonu ve školní praxi II.
/Edaphic ecology in school work II./

Přírodní vědy ve škole, 31, 1979-80, No.3, pp.84-88.
7 figs.

A study of the soil and its animals is a suitable topic for practical excercises and also for independent assignments where pupils can study and observe edaphic animals found in cultivated soil, in meadow and forest soil, the influence of insecticides, pesticides, etc. The topic of the introductory excercise acquaints pupils with the theory and basic concepts of edaphic ecology, how to take samples and how to distinguish the mezo- and macroedaphic layers of the soil, what to do with the samples in the laboratory. During further lessons individual animals are observed, identified, drawn and compared. The article describes work procedures in individual excercises and also provides a key for determining various groups.

11.22
627. WEBB, G.P. - JACOBSON, M.E.: Body fat of mice and men: A class excercise in theory and practice.

Journal of Biological Education, 14, 1980, No.4, pp. 318-324.
1 fig.

The fact that people are overweight, especially in the developed countries, is becoming one of the important biological problems of modern times. In the developed countries much effort is devoted to research for finding means to deal with this problem. The authors of this article here offer a project for the study of the problem, where mice serve as models for studying the causes of obesity and how to reduce it. This project is based on several experimental studies and includes measurements of humans, to enable students to discuss the problem in a broader context. The methods for measuring excess fat have been practically verified. This experiment is suitable for laboratory work in the upper grades of secondary school.

11.23
628. BLUMBERG, B.: Spass bei der ausserunterrichtlichen Arbeit. /Enjoyable extracurricula activities./ Biologie in der Schule, 29, 1980, No.5, pp.213-215.
3 figs.

The experience of teachers who supervise hobby clubs indicate that in view of the fact that pupils are often tired after school it is good to include such activities which are above all enjoyable. The author describes his own experiences in supervising a hobby club made up of 6th to 8th class pupils called "Young Biologists". At meetings they solve riddles or deal with texts which contain some error and the task of the reader is to discover what it is; they also devise riddles containing the names of plants or animals or famous biologists. The author cites the example of such a text which has "hidden" in it the names of 25 different animals and a text which contains errors. He also cites the examples of a puzzle and humerous pictures.

11.23
629. FIDO, H.: Zonation studies on a rocky shore.
Journal of Biological Education, 14, 1980, No.4, pp. 303-310.
6 figs.

In this article the author develops a method suitable for students of the upper classes of secondary school, where cross-sections of flora found on rocky shores are studied. With the help of frames made by the students and other do-it-yourself aids, his students gradually measured the number and species of flora in selected squares measuring 50 x 50 cm. This data was then entered into a form prepared by the author. The outcome provides a comprehensive survey of a given area and makes it possible to draw floral maps. This method can be useful for field work in the vicinity of the school or areas close by.

11.23

630. FRITSCH, H.: 20 Jahre Weiterbildung im Prozess der Arbeit - 20 Jahre überschulischer Fachzirkel Biologie im Hennigsdorf. /20 years of further inservice education - 20 years of the activities of a specialized biology club in Hennigsdorf./

Biologie in der Schule, 29, 1980, No.4, pp.143-145.

Problems of qualification and further education are increasingly topical. Besides further education in the form of courses, acquiring improved qualification in facilities run by the Pedagogical Council or on the basis of independent study, also specialized clubs have an important role to play. These clubs are associations of teachers and educators who focus their attention to improving their teaching skills. These clubs support the creative endeavours and the iniciative of all teachers. The author describes the activities of such a club in Hennigsdorf, which has been active for 20 years.

11.23

631. GOODWIN, J.: Spinning and dyeing using natural materials. Natural Sciences in Schools, 17, 1979, No.1, pp.5-9,31. 3 figs.

The author acquaints the reader with a programme for extracurricula activities, which deals with the processing of wool. The students first learn about various types of wool and their method of processing. Also historical aspects are used - various methods of processing wool from the Neolithic until the 18th century are studied. The students can try their hand at these various methods in practical excercises. They also learn to dye wool, even if this brings with it some problems /for instance the majority of dyes are poisonous/. The article also includes diagrams of some historical tools with detailed instructions for their use and a survey of the most suitable dyes and pigments used for wool and how to use them.

11.23

632. LANGNER, Z.: O pracy koła LOP w Bojanowie. /On the work of a League for Nature Conservation /LOP/ club in Bojanowie./

Biologia w szkole, 33, 1980, No.2, p.125.

The school chapter of LOP at the secondary agricultural school in Bojanowie has 200 members in 4 sections /botany and zoology, editorial, artistic and framing/. Its members are active in environmental conservation in the vicinity of the school, in planting trees and "green belts", in forest conservation work, collecting scrap paper and caring for animals in the winter, as well as in acquiring natural specimens for use in class and for collections in the school. They also organize meetings concerning environmental conservation, edit a bulletin board on this subject, organize meetings of club members, carry on a chronicle of the club's activities and correspond with various experts in this field. The club also organizes excursions and cooperates with tourist organizations and research institutions.

11.23

633. LEBEDEV, V.P.: Izucheniye ontogeneza mnogoletnikh travyanistikh rastenii. /Studying the ontogeny of perennial grasses./

Biologiya v shkole, 54, 1980, No.3, pp.55-57.
1 fig., 2 tabs.

The article describes various methods of work in a botany club composed of pupils from the 9th class, especially when they studied the first stages of ontogeny on the sow thistle weed /Sonchus arvensis/. The club was divided into 3 groups with 4 pupils in each group; each group planted the seeds into a box in the autumn, observed their development and recorded each stage with a pressed specimen. During the whole course of the year the pupils achieved a general concept of the ontogeny of the plant, which was added to those they gained during outdoor excursions.

11.23

634. OSTROWSKI, H.: Działalność szkolnych kół LOP w województwie łomżyńskim. /The activities of school chapters of the League for Nature Conservation /LOP/ in the Lomzynski region./
Biologia w szkole, 33, 1980, No.5, pp.314-315.
1 photo.

In this region 13 000 pupils of basic schools are members of the League for Nature Conservation and they are organized in 115 chapters. On June 2nd and 3rd 1980 their work was evaluated and the best schools received prizes. The general results of the work achieved are very good.

11.23

635. OSTROWSKI, H.: Koła LOP w woj. Bielskopodlaskim.
/Chapters of the League for Nature Conservation in the Bielskopodlaski region./

Biologia w szkole, 33, 1980, No.2, p.124.
1 fig.

In October 1979 at Czemierniki a two-day conference was held of the commission for youth activities of the League for Nature Conservation. 166 chapters of this organization are active in the region; of this number 15 are at higher types of schools. They have a total of 13 530 members; since 1977 membership had increased by 6.5 thousand young people. 114 clubs participated in a competition for the best League chapters. Its members were also successful in the competitions of the Biology Olympiad. The competition in school leaving examination essays concerning nature conservation topics were also won by its members who were also active during Forestry Day and participated in planting new trees in the forest on an area of 50 hectars. The best chapters received awards at the conference.

11.23

636. SCHWETSCHKE, U.: Einige Erfahrungen aus der Arbeit in einer AGR "Sozialistische Landskultur". /Some experiences concerning the activities of hobby clubs for "Landscape Conservation and Formation".

Biologie in der Schule, 29, 1980, No.9, pp.386-389.

Pupils from the 9th and 10th classes are members of this hobby club. One of the aims of its activities is to conserve biotopes which have to recede due to the development of agriculture at some other location. In planning the activities of the club it is important to combine the process of learning with socially useful utilization of what has been learnt; the author documents this on the basis of several examples. Among the activities the pupils undertake are determining geographical position, climate, attitude, predominating direction of wind, average temperature, quantity of precipitation, duration of sunshine, the beginning and end of the period of vegetation. Special attention is devoted to the geological and floral characteristics of the given territory, the long-term observation of birds and small mammals, as well as learning basic entomological techniques.

11.23

637. SIMON, H.: Empfehlungen zum Einsatz von Unterrichtsmitteln in der AGR "Sozialistische Landskultur". /Recommendations for the utilization of teaching media in a Nature Conservation hobby club./

Biologie in der Schule, 29, 1980, No.12, pp.515-521.

For the implementation of the content of hobby club activities various teaching media are used. Their greater part are those which are used in mandatory school instruction; they can, however, serve also for this purpose. But also teaching media from other subjects can be used /from chemistry, physics, geography, civics/, as well as those borrowed from other schools /colleges or universities/. The recommendations which the author offers do not mean that hobby clubs should have their own teaching media /with the exception of a few chemicals/. A final survey cites films, slide series, tape recordings, transparencies, tables, maps, instruments, models and chemicals which can be used in hobby clubs.

11.24
638. GROCHOWSKA, E.: Człowiek - środowisko civilizacja.
/Man - a civilizational environment./
Biologia w szkole, 13, 1980, No.2, pp.121-123.

The author informs the reader of a scientific and popular science conference organised at the 9th general education secondary school in Warsaw on the 16th to 18th December 1979 which concerned environmental conservation. The development of technology and a high degree of industrialization are the cause of changes in man's environment. Natural resources which are needed for the growth of civilization are becoming exhausted, nature is damaged by the unfourtunate intervention of people, human population is steadily increasing and the biological equilibrium existing in nature is threatened. Other dangers posed by civilization require the conservation and development of nature and the environment. The author describes the youth conference held on these problems.

The conference concentrated on problems of environmental conservation education. It was organized by pupils in the 4th class of biology and chemistry specializations and by members of the biology hobby club and the school team of the Biology Olympiad. 15 papers were presented to the conference; the papers of the first day concerned selected problems of environmental conservation in Poland and throughout the world and the international cooperation which exists between Poland and UNESCO. On the second day, problems concerning man in the present stage of human civilization were discussed, together with problems connected with the development of technology and industry in Warsaw and its vicinity, as well as problems of nutrition in urban concentrations. On the third day the conference concentrated on problems of nature conservation and preventive activities in this area, the function of man in the environment, man as a disturbing, but also organizing and developing factor in the environment, problems connected with re-cultivation, the significance of green areas in urban agglomerations, various forms of nature and environmental conservation, etc. Various films, and slides were shown at the conference, as well as posters, bulletin boards and press items. Also the work of pupils in environmental conservation was summed up and evaluated.

11.24

639. SIMON, E.W.: Learning to interpret data.

Journal of Biological Education, 14, 1980, No.2, pp. 132-136.
1 fig.

The ability to properly explain data usually depends upon the qualification of the teacher, i.e. his understanding, application, analysis, synthesis and assessment of the data available. Also students should acquire such abilities. This can be done in the course of discussions where such topics as the experiments students have undertaken and their interpretation are discussed. The author, who is a botany professor from the University of Belfast, provides detailed instructions on the organization of such discussions, where students are led towards carrying out correct, logical and comprehensible interpretations of their biological knowledge. These discussions end with an interpretation of data in the form of examinations which show to what extent the students have acquired interpretational skills.

11.25

640. ANGSEESING, J.P.A.: Investigating the limits of sensory discrimination.

Journal of Biological Education, 14, 1980, No.2, pp. 147-152.

The author analyses 2 well known theories concerning the limits of sensory discrimination: the theory of quantity and the theory of statistical discrimination. On the basis of analysis he describes an experiment with a group of 12 students who work in pairs. The findings are summed up in a table with diagrams and a commentary. The tests which makes up the experiment indicate very well the ability of speedy response and/or intelligence of the students. These tests can be given in the upper classes of secondary school. They provide basic information on the mental abilities of the student.

11.27

641. BELYKH, I.N. et al.: Laboratoria pod otkrytim nebom.
/An outdoor laboratory./

Biologiya v shkole, 54, 1980, No.3, pp.60-65.

The article is composed of eight sections where experienced teachers from various regions of the USSR describe their suggestions, experiences and comments concerning the work of pupils on outdoor plots of land, especially during observations and experiments with various biologically interesting plants which are also important from an economic point of view.

11.32

642. ALTMANN, A.: Zoologická exkurze na základní škole.
/A zoological excursion in basic school./

Přírodní vědy ve škole, 31, 1979/80, No.10, pp.363-365.

From a didactical, as well as specialized point of view zoological excursions, in comparison to botanical excursions, are more difficult both for the teacher and his pupils. The material observed is extensive, varied and its incidence during the day or in the course of changes in the weather tends to be change. Especially entomological excursions are difficult. But the outcome of the excursion has such a positive effect on the motivation and interest of the pupils in learning biology that it is necessary to overcome the cited difficulties and to make maximum use of them.

11.32

643. DALE, C.R.: The biotic indexing of water quality and its application to field work in schools and colleges.
Journal of Biological Education, 14, 1980, No.3, pp. 205-212.
10 tabs.

The quality of water is, among others dependent on biotic indicators, which usually concern very small fauna found in water. The author introduces the problem by commenting regulations on the classification of water quality, indicators of pollution and in what manner the biotic indexing of water is carried out. He uses several biotic indexes and draws up a table of examples, where the quality of the water depends on the presence or absence of fauna. Students can carry out such indexing rather simply and this provides a reliable indicator of the purity or pollution of a water source.

11.32

644. DAVID, R.: Deux journées d'étude écologique sur le secteur de Mazamet. /Two days of ecological studies in the Mazamet region./
Biologie-Géologie, 67, 1980, No.2, pp.425-429.
3 figs.

The subject of the ecological excursion described by the author is a wooded region with 820 meters altitude. The topics studied included structural aspects, the soil and the influence of man on the area. Practical advice concerns the organization of the excursion and how to stress ecological aspects.

11.32

645. DERZHAVINA, T.B.: Zimnyaya ekskursiya v prirodu.
/A winter nature excursion./

Biologiya v shkole, 54, 1980, No.6, pp.43-47.

The author describes an excursion concerning the topic of the stem /in the 5th class/ which can be organized in the middle of February for a period of 65 minutes to the immediate vicinity of the school /for instance to a park/. During the preparations for the excursion at least 25 minutes in the preceding lesson should be devoted to the topic of the excursion, dividing pupils into groups and giving them assignments. The pupils should also become acquainted with the material collected during the autumn excursion. Before setting out, aspects of non-living nature should be discussed. Among the assignments for the excursion are comparisons of trees which shed their leaves and coniferous trees, buds, the forming of annual growth rings and how seeds or fruits survive the winter.

11.32

646. FALK, J.H.: Taking advantage of local resources: Lawns - a case in point.

The American Biology Teacher, 42, 1980, No.6, pp. 351-353,355.
1 fig.

For students in large cities organizing an outdoor excursion can be difficult in view of the long distance to be covered and the resulting loss of time. The author, on the basis of his own experience, describes an excursion to the lawns of the local park, where it was possible to find 130 species of insects. Also findings of flora tend to be quite satisfactory from such excursions. It is easier to collect specimens, because the material can be collected horizontally. It is also possible to study the influence of cultivation, insecticides and other chemicals, as well as the influence of possible pollution. The author describes both the organization of the excursion and the methods used for its assessment, the classification of what was collected and its summary in tables and graphs.

11.32

647. FREEMAN, P.: An ecology field trip focusing on inquiry - a northern perspective.

The American Biology Teacher, 42, 1980, No.7, pp.411-416.
4 figs.

The author, who is a biology teacher, here discusses the preparation, organization and course of an ecological excursion to the natural environment of northern Ontario and some of the northern states of the US. He describes how the students collected plant specimens specific for the region, measured the density of various populations, etc. The students were equipped with various simple instruments for measurements and collections. They summed up the outcome of their measurements and studies into questionnairs prepared beforehand. Observations can also concentrate on problems connected with nature and environmental conservation.

11.32

648. FRITSCH, H.: Arbeitsanleitungen zur ökologischen Exkursion in Klasse 11. /Instructions for work during ecological excursions. in the 11th class./

Biologie in der Schule, 29, 1980, No.1, pp.21-28.

For each practical instruction the author cites the theoretical aspect of the problem according to the teaching syllabus, the formulation of the assignment, the equipment needed and how records should be kept. The activities this concerns include the following: beginning a herbarium of plants selected from the point of view of ecology, the measurement of abiological factors /light, temperature, humidity/, enumerating characteristic plant species from the point of view of the ecosystem, identifying plants according to a key, the morphological comparison of the adaptation of xerophyte leaves and those of hyrophytes, an assessment on soil reaction in a biotope on the basis of plant indicators, taking soil samples from xerophyte and hygrophyte biotopes for determining the humidity of the soil,taking water samples to determine the degree of water pollution, measuring the pH of a soil sample, measuring the calcium content in the soil, filtrating water to assess degree of pollution, etc.

11.32
649. GÄRTNER, M.: Zur ökologischen Exkursion in Klasse 11.
/On ecological excursions in the 11th class./

Biologie in der Schule, 29, 1980, No.9, pp.374-383.
5 figs. 2 tabs.

A school excursion must be carefully prepared. The author provides three different sets of instructions. The first includes making a herbarium with plants important from an ecological point of view /while taking into account plant conservation/. The second concentrates on the measurement of abiotic factors in the environment /light, temperature, relative humidity/, where the author concentrates especially on the first and last of these. The third work method requires an enumeration of characteristic plants and /or animals in a specific type of ecosystem on the basis of morphological comparisons of the adaptation of xerophytes and hygrophytes. In conclusion the author cites 7 different questions for pupils as assignments during the excursion.

11.32
650. KLAHN, G.: Was verraten uns die Tierspuren? /Eine Projektarbeit in 7-8. Schuljahr zur Erarbeitung einiger Grundbegriffe der Oekologie und Ethologie.
/What traces of animals can tell us. /A work project for the 7th and 8th classes for dealing with basic notions in ecology and ethology/./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.6, pp.161-170.
14 figs., 2 worksheets.

The traces left behind by animals provide information not only for the hunter, but also for pupils who in the forest can thus determine the presence of numerous game. usually hidden to the visitor. Traces should be followed not only on the ground, but also traces of feeding and other activities. A study of animal tracks provides opportunities for acquainting pupils with basic ecological notions, as well as those of ethology. The best place for studying animal tracks is in the forest, in wintertime, when the snow makes everything more visible. Durning an excursion, pupils should also become acquainted with the legal regulations which govern game hunting and care of game. Various material can be collected during the excursion, tracks drawn or photographed, fox lairs, woodpecker nests in tree hallows, sqirrel stores, etc. can be found, etc. The author describes the course of the excursion, the animals whose traces can be found and assignments for individual groups. He also provides instructions for the speedy taking of plaster casts from animal tracks /a little salt should be added to plaster of Paris which makes for more rapid setting/.

11.32

651. LEE, E.W. - MYERS, C.F.: The field trip as an aesthetic experience.

The Science Teacher, 47, 1980, No.4, pp.24-25. 1 fig.

A number of teachers, as well as scientists, have a sceptical opinion of everything which cannot be measured, weighed or verified by experience. The author advocates the use of an "aesthetical method" which in her opinion supplements or fills in the cognition of the material world. She describes specific examples of the use of this method during vacation-time excursions to various natural environments, such as mountains, forests, lowlands, the seacoast, etc. where nature makes a direct impact upon the aesthetical feelings of pupils. The sun, wind, rain, waters, forests, rocks, night sky are all sources of aesthetical experiences, which can be discussed around a campfire. The article provides interesting incentives for educators.

11.32

652. MOHR, H.: Erfahrungen zur wissenschaftlich-praktischen Arbeit von Schülern Erweiterter Oberschulen im Zoologischen Garten Leipzig. /Experiences with organizing scientific and practical work of secondary school pupils in the Leipzig zoological gardens./

Biologie in der Schule, 29, 1980, No.2/3, pp.69-72.

Scientific and practical work done by pupils should form part of a general education. It makes it possible to implement polytechnical education and extends specialized education. This type of work has been organized by the Leipzig zoological garden since 1970. The pupils study parental behaviour of animals, care of young animals and their feeding. The author analyses individual cases and cites his own opinions and plans for the future.

11.32
653. **MOREL-FOURRIER, J.C.:** Excursion sur le site de Caumont sur Durance. /An excursion to the region of Caumost sur Durance./

Biologie-Géologie, 67, 1980, No.2, pp.409-424.
11 figs.

The article describes in detail how the author prepared a school excursion whose purpose was to acquaint pupils with the landscape, to carry out detailed observations and to answer questions given to pupils in the form of assignments; before departure, the author prepared a bibliography and documentation on the area to be visited and the pupils also undertook topographical excercises. The excursion itself is described and examples of the pupils' drawings, maps and photographs are shown. In conclusion the author assesses some morphological and paleontological aspects which were studied during the trip.

11.32
654. **MOORMAN, C.K.:** "Expeditions" - Journeys with a purpose.

The American Biology Teacher, 41, 1979, No.4, pp. 217-218, 232.
2 figs.

"Expedition" is the name of a new course, which the author helped to develop. It is aimed at talented high school students as an extention of the mandatory course. The particpants work for the most part independently and solve problems they themselves have chosen. They adhere to a basic procedure beginning with the formulation of a problem, the research itself and an interpretation of the findings, up to the writing of a research report and its presentation to a meeting of students and parents. The author describes some of the organizational details of the course and some of the assignments given: whether it is possible to freeze and thaw out a snail or how to determine the cause of piglet deaths on the basis of a post mortem.

11.32

655. OKOŁOW, C: Organizacja wycieczek dydaktycznych w parkach narodowych i rezerwatach przyrody. /The organization of didactical excursions to national parks and nature reservations./

Biologia w szkole, 33, 1980, No.5, pp.281-285.

Annually over 9 million people vist Poland's national parks and nature reservations; of this number, 20% are school children. Excursions first of all have an educational purpose. The author discusses whether such excursions actually enlarge the pupils' knowledge of nature, whether they serve the purpose of nature and environmental conservation an whether they are really an extension of school work or just a pleasure trip. The author criticizes these excursions, because they represent more tourism than education and teaching. He indicates methods of improving the quality of these excursions by improved preparations and by making use of what has been seen in subsequent class work. He makes various suggestions and recommendations for their preparation and organization. Pupils should be at least 13 years old and individual groups should have no more than 25 pupils. In conclusion the author expresses the opinion that this type of excursion should be made maximum use of and should be supplemented by other types of excursions, for instance to museums, etc.

11.32
656. OLCZYK, B.: Współpraca godna naśladowania. /Cooperation worthy of being copied.

Biologia w szkole, 33, 1980, No.5, pp.297-299.
1 tab., 1 worksheet.

The staff of the zoological gardens in the town of Lodz have prepared a methodological manual for pupils and teachers, which is a valuable aid in implementing excursions to a Zoo. The manual develops educational aspects for teachers and contains various assignments which will contribute to having pupils observe closely what they see in the Zoo. The author describes the use of these assignments and the manual as a whole, on the basis of the example of the topic amphibians and describes the course of an excursion to the Zoo and the subsequent lesson in class.

11.32
657. TAIEB, D.: Une sortie de géologie régionale realisée en classe de 4me. /A regional geological excursion carried out with the 4th class./

Biologie-Géologie, 67, 1980, No.1, pp.67-70.
1 fig.

The author describes the course of an excursion into the near vicinity of the school in Steins. The purpose of the excursion was an analysis of the landscape, the observation of geological details in a quarry and a discussion of how best to utilize the subsoil and soil. Another purpose of the excursion was to find answers to the question of the relation between the soil and the landscape relief and between the soil and its vegetation. The author also describes her preparations for the excursion and its subsequent utilization in class work. The excursion demonstrated that direct contact with nature can lead to an extension of pupils' knowledge. Added to the article is a report written by a 4th class pupil concerning a visit to a briquetting plant which the class visited during the excursion.

11.32
658. WRIGHT, E.L.: Salad bowl biology.

The American Biology Teacher, 41, 1979, No.2, pp. 80-85.
4 figs., 2 tabs.

With the advent of hot weather teachers tend to look for suitable topics for excursions. The article describes an excercise in botany, which has interesting motivations. Since April students can look for plants which are suitable for making a salad. Identifying the found plants can serve the purpose of also identifying producer - consumer relations in communities. The author describes a May excursion for 30 biology teachers who looked for flora in general and also edible plants, which were then divided into those that require cooking and those that do not. The collected plants were identified and summed up in a table with data concerning their locality and method of use. Also details are given on how to make a salad from the described plants.

11.34
659. ANDRÁSSY, P.: Kozépiskolai biológia tanulmányi verseny a Nyugat-Dunán-túlon. /A biological competition for secondary school pupils in the Western Danube region./ A biológia tanítása, 19, 1980, No.1, pp.20-22.

The article provides information on the course of a biology competition for pupils of the 1st and 2nd class of secondary schools which was called "The Pál Kitaibela Biology Competition", which in 1978/79 contained tests pertaining to the secondary school biology syllabus and the topics on which articles had been published in popular journals. The competition indicated that there are sizable differences between pupils from various schools, as far as their preparation and performance in the competition was concerned; good results assume both the talent of the pupils and his diligence, as well as thorough preparations for the competition on the part of the teacher. Negative experiences existed as far as pupils' practical skills are concerned. In the final part of the article the author discusses the future of the competition, which was largly successful and will continue to be organised in subsequent years. A total of 600 pupils from all parts of Hungary participated in the first round of the competition.

11.34
660. Az OKTV 1978/79. Évi biologiai verseny II. fordulójának feladatai. /The assignments of the 2nd round of a nationwide biological competition in 1978/79./

A biológia tanítása, 19, 1980, No.4, pp.113-120.
3 figs.

The article cites 38 questions which formed the assignments of the biology competition described in an article by P. Andrássy in issue No.1 of the same journal. The questions included the following topices:

- phytosynthesis
- carbohydrates
- determining unknown solutions
- enzymes
- element composition of living substance
- biological oxidation
- osmotic concentration of red blood cells.

11.34
661. FRANYÓ, I.: A természetkutató úttörök országos vetélkedőjének tapasztalatai./Experiences with a nationwide Young Pioneer competition of natural scienticsts in 1980./
A biológia tanítása, 19, 1980, No.5, pp.175-181.

The article deals with the 2nd annual nationwide competition of Young Pioneers which contained topics on the natural sciences as such, not specifically in biology, chemistry, physics or mathematics as such. This complex approach made it possible to leave aside the school syllabus and provide a change for those pupils who are capable of independent thinking.

In the final part of the article the author cites the questions given in the competition.

Answers were given orally. It was found that a certain polarity existed among the pupils - some were much more proficient in theoretical problems, while others in dealing with practical problems.
Of 23 groups, only 8 has results indicating a balanced approach to both theory and practical problems. The outcome of the competition was assessed in a positive manner; even the worst group answered 60% of the questions.

11.34

662. Az 1979/80. Évi OKTV biologiai versenyének végeredménye.
/The final outcome of the nationwide biology competition for secondary school pupils in the school year 1979/80./

A biológia tanítása, 19, 1980, No.4, pp.125-127.

The article cites the names of the victors in two categories- the pupils of general education secondary schools and secondary schools specialized in biology. Also the school and class are cited for each winner.

11.34

663. Az OKTV 1979/80. Évi biológiai verseny II. fordulójának feladatai /I. rész/. /Assignments in the second round of a nationwide biology competition in 1979/80 /part I./.

A biológia tanítása, 19, 1980, No.6, pp.179-186.

6 figs.

The assignments given to pupils participating in the competition included the following:

- the excitation of bacteria
- polarity in the stem /tropism/
- the influence of physical work on blood circulation
- thyroid gland surgery.

11.34

664. Az OKTV 1979/80. Évi biológiai verseny II. fordulójának feladatai /2. rész/. /Assignments in the 2nd round of a nationwide biology competition in the year 1979/80 /part II./.

A biológia tanítása, 19, 1980, No.5, pp.181-190.

7 figs.

The assignments in this part of the competition included the following topics:

- respiratory movement
- a pulsating vacuole and its activity
- cell respiration /biological oxidation/ and photosynthesis
- plant plasmolysis
- the creation of energy in the human organism
- digestion in the human stomach
- bonding CO_2 in plants.

The illustrations concern some of these assignments.

11.34
665. Az OKTV 1979/80. Évi biológiai versenyének tapasztalatai. /Experiences with the 1979/80 annual nationwide biology competition for secondary schools./
A biológia tanítása, 19, 1980, No.4, pp.110-112.

The article describes the course of the competition and the selection of assignments and discusses some of the problems connected with the present state of affairs caused by the gradual introduction of a new textbook - Biology III. The pupils of various schools thus had various literery sources for their preparation. Also some of the negative aspects of the organization of the competition are mentioned, especially those connected with the assessment of winners. Since the article is rather critical, it is hoped that in future years these shortcomings will be overcome.

11.34
666. GŁOWACKA, A.: Pomiary cech morfologicznych roślin zbożowych. /Measuring the characteristics of cereals./
Biologia w szkołe, 33, 1980, No.2, pp.106-108.

In biology teaching also problems connected with the conservation of the environment are taught. This is also a topic frequently encountered in Biology Olympiads in Polish schools. For instance the fallout from chemical works influences the morphological characteristics of cultivated plants, for instance cereals. The author demonstrates the use of these topics in preparing questions and assignments for the Biology Olympiad, in which pupils from general education secondary schools participate. Among the problems studied are the effect of chemical substances on the morphology of cultivated rye /the Dankowska Golden variety /, where the morphological properties of spikes cultivated in the close vicinity of chemical works /from 500 to 1500 m and 3 to 5 kilometers/ are analysed. 100 rye plants are assessed in the autumn and winter and the influence of chemical emissions on the growth and development of individual spikes, leaves, the number of grains in a spike, the lenght of the spike are determined. The findings are summed up in tables. The work is interesting for pupils and the outcome is often surprising, since it serves to clearly demonstrate the influence of chemical substances on the development and life cycle of cultivated plants.

11.34

667. GŁOWACKA, A.: Propozycje zajeć koła biologicnego w LO. /Suggestions for assignments in biology concerning the conservation of the environment./

Biologia w szkole, 33, 1980, No.5, pp.301-305.
7 tabs., 3 figs.

The problem of nature conservation is especially pressing in urban and industrialized areas. Pupils can participate in dealing with problems of environmental conservation by observing and recording the degradation of the immediate vicinity of their school. For this purpose the author recommends using a cytology method for the study of the course of meiosis in plant material. The course of meiosis can be compared in the anthers of rye cultivated in the immediate vicinity of an industrial facility and rye cultivated in an environment where there are no industrial emissions. Thus the subject of study is the influence of emissions on the course of meiosis. The pupils carry out the experiment on 3 fields, 2 of which are 100 to 500 meters from an industrial works and the third is 3 to 5 kilometers away. The author describes in detail how to procede in the work. The differences are observed during the prophase of the first stage of meiosis, in the metaphase, anaphase and telophase, as well as in the interkinesis stage, in the metaphase of the second part of meiosis and in the anaphase and telophase of the second part of meiosis. On the basis of these observations a table is drawn up. The best variety of rye to study is Danbowska Golden in the vicinity of a chemical works, where the influence of suphur dioxide, dinitrogen pentoxide, hydrogen monosulphide and hydrochloric acid vapours can be studied.

11.34
668. MEDVE, R.O.: The biology olympics.

The American Biology Teacher, 42, 1980, No.4, pp.223-225 . 9 figs.

The author describes the scope and content of a biology olympics organised by a high school in cooperation with the Pennsylvania Youth Science Academy.

The olympics included team assignments and individual assignments, and concerned general knowledge, experimental drawings, biological puzzles and finding specific leaves, berries, flowers etc. in nature on the basis of a list. Individual assignments concerned genetics, ecology, physiology, taxonomy, anatomy. Each of the 9 photos attached to the article show some olympics assignment.

11.34

669. WÓJCIK, B.: Funkcje olimpijskiej pracy badawczej.
/The function of reserach assignments in Biology Olympiads./
Biologia w szkole, 33, 1980, No.2, pp.83-87.
3 tabs.

Biology Olympiads are of great significance for the modernization of biology teaching in schools. Every year the best pupils, who have the greatest interest in the subject and are most capable of logical thinking, the application of scientific knowledge to practical tasks, who are capable of solving problem tasks, to interpret findings and who are capable of self-control, participate in these competitions. The author points to various opportunities provided by Biology Olympiads for pupils´ independent research work, the independent study of literature as a source of information, etc. Also methods of study used in Biology Olympiads are discussed and special attention is devoted to observations and experiments. The author discusses the pupils´ abilities to carry out experiments; especially the following aspects should be judged: how the experiment was planned, how its findings were assessed, the precision of the work carried out, the ability to take into consideration side-effects, the ability to measure various values in biology, the ability to use repeated experiments and control experiments for drawing conclusions, etc.

11.34
670. ZDEBSKA-SIEROSŁAWSKA, J.: Dla uczniów szkół średnich w roku szkolnym 1981-1982 pod hasłem Woda i życie. /For secondary school pupils in the school year 1981-1982 concerning the subject of Water and Life./

Biologia w szkole, 33, 1980, No.4, pp.250-254.

The author acquaints the reader with the new tasks for all levels of Biology Olympiads in the school year 1981-1982. The datelines of individual stages of the Olympiad are cited, as well as detailed instructions for pupils' assignments given. The main theme of the Olympiad is the subject of water and life.

11.34
671. ZDEBSKA-SIEROSŁAWSKA, J.: Rośliny wyższe i zwierzęta kręgowe w przyrodzie i gospodarce człowieka. /Higher plants and vertebrates in nature and in human agriculture./

Biologia w szkole, 33, 1980, No.4, p.246.

The author provides information on the finals of the 9th Biology Olympiad, which took place at the University of Warsaw and which represented the third round of the competition. 143 competitors, together with their teachers, parents, representatives of the

Ministry, radio and TV participated. 19 teachers were awarded for excellent school work. The names of 20 winners of the Biology Olympiad are also attached to the article.

11.4
672. K biologicheskim olimpiadam shkolnikov. /Concerning the Biology Olympiads of school children./

Biologiya v shkole, 54, 1980, No.4, pp.72-73, 1 fig.
No.5, pp.73-74, 2 figs.
No.6, pp.69-70, 2 figs.

One of the main tasks of Biology Olympiads is to increase the interest of pupils in biology, to assess the quality of knowledge achieved in classwork, to teach pupils to think, to correctly use biological notions and to precisely formulate thoughts. All three cited articles publish examples of assignments for pupils in the 5th to 10th classes.

11.6
673. GIRARD, L.: Deux exemples de devoir en terminale D et premiére A. /Two examples of assignments for the third and first class of the upper level./

Biologie-Géologie, 67, 1980, No.1, pp.71-75.
7 figs.

Prof. Girard describes the content of assignments which he gave to the third and first class of the upper level. In the former, pupils were asked to practically apply what they had learnt about the cell, the anatomy and the histology of the nervous system. In the latter, the pupils were asked to apply what they knew about the cell, of course at a lower level. The assignments are accompanied by pictures.

11.6

674. MYAGKOVA, A.N. - RUMYANTSEVA, M.N.: Domashneye zadaniye-vazhnaya chast processa obucheniya biologii. /Homework - an important component of biology teaching./
Biologiya v shkole, 54, 1980, No.4, pp.35-40.

Homework should serve to properly organize the work of pupils after school and should teach them the habit of independent work. This especially includes work with texts, pictures and questions found in the textbook, but also observations carried out outdoors, carrying out simple experiments, the formulation of conclusions; besides the newly learnt subject-matter, also a repetition of previously learnt subject-matter should form a part of homework. Pupils must be able to place the new knowledge into the context of the whole. Homework should also require the use of comparisons, drawing up tables, outlines, the reading of supplementary literature /of course on the basis of precise instructions from the teacher - the basic use of literature must be taught in class/. Homework should be approached in a differentiated manner. It is necessary to systematically verify its quality and how it has been done, since this has a decisive effect on the effectiveness of teaching.

11.8

675. BAADE, H.: Gestaltung eines Naturlehrpfaden und seine Nutzung im Biologieunterricht. /The demarcation of a science trail and its use in biology instruction./

Biologie in der Schule, 29, 1980, No.2-3, pp.77-83.
2 figs.

The committee for biology teaching subjects in the district of Altenburg has for many years made recommendations to teachers concerning the organization of excursions. This is done in cooperation with the District Nature Conservation Administration. The work connected with the demarcation of a science trail was begun in 1975; its outcome is the trail itself and a booklet which provides descriptions and instructions for its use /including instructions for the collection of various plants, observations and experiments to be carried out by pupils of the 9th class/. The author also discusses the criteria used for selecting the course of the trail and how it can be used for various forms of educational work.

11.8

676. BERG, D.: A career education course in forest biology.

The American Biology Teacher, 42, 1980, No.7, pp.454-456, 461.
5 figs.

The author, who is a specialist in forest biology, has developed a course for secondary school students on this subject. He begins with an identification of forest flora and fungi, including Deuteromycetes which are an important cause of tree disease. He also discusses parasite plants /such as mistletoe/. The course continues with forest entomology, the observation of mammals and other living organisms. Supplementary topics include the ecology of forest fires, the activities of forestry service personnel, and basic information on the wood processing industry, The author also mentions methods for the utilization of forest waste. To complete the course, students deal with concrete problems in forestry stations and wood processing plants.

11.8
677. BUTTERFIELD, C.H.: Estimating the gray squirrel carrying capacity of an acre of oaks.

The American Biology Teacher, 41,1979, No.6, pp.332-335, 354.
3 figs., 2 tabs.

The article describes an outdoor laboratory excercise for students of the upper classes of primary school, which can be part of the biology course, ecology course or a course on the environment. In a marked out area of an oak forest they carry out various measurements to estimate the number of squirrels which could live there. Within the framework of the excercise the children learn to identify various species of oaks according to a key, they measure the diameter of the trees, calculate the output of plant bio-mass and the calory intake of a squirrel per day and year. These data are the compared and on the basis of simple calculations; the carrying capacity of the forest is measured.

11.8

678. COLLIER, J.A.: Wilderness experiences: Education for living.

The American Biology Teacher, 41, 1979, No.1, pp.24-26,39.
4 figs., 1 tab.

The author describes his own experiences with a course called "Winderness experiences", which was organized for students at the State University in Idaho. The topics covered included the foundations of ecology, geology and movement in a difficult terraine. During the first week of the course, held in a camp, the students learnt to photograph, became acquainted with ecological cycles, with edible and poisonous plants, they learnt to find their way with a compas, become acquainted with the foundations of mountain climbing, etc. An important part of the course are the basics of first aid. The course was very welcome especially by those students who want to become guides in recreational areas or teachers. Besides the teaching of the subject-matter, the course also provided students with more specialized knowledge in biology, with manual skills and with spiritual enrichment, since they were able to gain positive attitudes towards the natural environment and to establish firm friendships with other participants.

11.8

678. HEINRICH, D.: Specialistenlager - eine interessante und auspruchsvolle Feriengestaltung. /A specialist camp - an interesting and demanding form of organizing vacation time./

Biologie in der Schule, 29, 1980, No.4, pp.145-151.

The majority of the tasks which instruction has, are realised is the classroom. However, other forms of instructions should be developed, among them those which during vacation time enable pupils to broaden the knowledge they have gained in school. The author describes the experiences of such a camp. Its participants were 15 to 20 pupils from the 6th to 12th classes of secondary school. The duration of the camp was 12 days and it was financed by the district school administration. The author concentrates on the subject-matter of the camp and discusses the special aspects of the collective which was formed, the educational process, the study of flora and fauna, tasks which the camp set for itself in nature and environmental conservation, as well as the making of various teaching aids for class work.

11.8

680. KERRY, T.: Hartsholme: a model for devising and using a nature trail.

Journal of Biological Education, 13, 1979, No.1, pp.32-40. 4 figs.

The article describes the devising and using of a nature trail in the Hartsholme national park, which serves educational purposes. In the introduction the author describes various stages of devising the trail and the principles according to which this was done. The main part of the article is devoted to various opporutnities which the trail provides as a supplement to class work and for acquainting students with some experiments. Depending on the subject-matter, the trail can serve the purpose of repetition and reinforcement of what has been learnt, as well as for the acquisition of new knowledge and skills. Also the aesthetical feelings of the pupils can be developed on the trail and it can be used as a source of inspiration for verbal or graphic expression. The article also contains a survey of the mammals and flora which can be studied on the trail in their mutual linkage.

11.8
681. MALCOLM, S.L.: Educational use of an urban creek.

The Australian Science Teachers Journal, 24, 1978, No.1, pp.17-21.
4 figs.

The article describes the uses to which a creek in the city of Melbourne was put during biology teaching. Relatively well preserved ecosystems can be studied, as well as water pollution, erosion, degradation of flora, etc. The program is divided into several stages. First the students make a general bilogical survey of the territory in question, with the aid of biological, physical, geographical and hydrobiological data. After the preliminary stage, the study itself is developed. In conclusion of the project a detailed report is written on the situation in the creek area. The authors provide a number of methodological comments concerning instruction and the reponse of the students. In conclusion the authors discuss the advantages and disadvantages of urban creeks as objects of study, which for schools in urban areas are often the only opportunity to undertake a field excursion into natural environment.

11.8
682. MEINEL, W. - SCHÖCKE, K. - MATTHIAS, U.: Quantitative Phyto- und Zooplanktonuntersuchungen im Biologieunterricht. /A qualitative study of phyto- and zooplankton in biology instruction./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.3, pp.167-169.
4 figs.

In limnology studies the quantitative determination of plankton requires suitable methods which can be undertaken by pupils with a minimum of instruments and equipment. The authors describe such study projects, where the quantitative determination of phytoplankton is done with a membrane filter device. For the quantitative determination of zooplankton a plankton net is used, with a suitable size mesh and a specific amount of water is filtered. Then a stereo-magnifying glass /binocular magnifying glass/ is used. The study concentrates on ecological aspects and is done within the framework of the teaching subject biology. Pupils have an opportunity to directly participate in field work, in experiments and observations. It acquaints them with the dynamics of the organisms studied, with the physical and chemical properties of the water, the specie composition of phyto- and zooplankton, etc. For determining zooplankton the procedure is quite simple. A 30 to 50 litre sample of water is gradually filtered through a net with 90-100 mm mesh density. The organisms thus captured are immediately fixated with formol and counted with the aid of stereo-magnifying glass. This number is then recalculated per 100 litres of water.

11.8
683. PATTERSON, P.O.: Learning and living science at the NYSC camp.

The Science Teacher, 47, 1980, No.2, p.19, 6 figs.

Students who are science majors spend three weeks of their vacation in the wooded hills of Monongahela in West Virginia. Under the supervision of experienced specialists they are able to gain direct knowledge about nature and to verify what they have learn theoretically in school. The camp is very well equipped and even has a solar telescope. The outdoor curriculum is supplemented with sports and music.

11.8
684. SHOWELL, J.: Fieldwork from the air.

Natural Science in Schools, 18, 1980, No.1, pp.12-13. 1 fig.

A young professor of the natural sciences decided to become better acquainted with the landscape in the vicinity of where he teaches - from an airplane. When he first began to observe and photograph the landscape from an airplane he was surprised at the various objects he has not noticed when on the ground. The arial photographs he made became a source of interesting study for his students and helped them to understand the maps they had.

11.8
685. SIDOROWICZ, S.: Obóz przyrodniczy. /A nature study camp. /
Biologia w szkole, 31, 1980, No.2, p.125.

The Council for Education and Teaching in Bialej Podlaskiej, together with a committe of the Nature Conservation League organised a meeting for members of League chapters in this region in the town of Kodnia. Its aim was to acquaint members of the chapter with areas suitable for the study of flora and fauna, for excursions and the collection of natural objects for school collections. The pupils also became acquainted with the work of forestry services and gamekeepers and with protected areas and their problems.

11.8
686. SWINDELL, R.: A solar barbecue.
The Australian Science Teachers Journal, 24, 1978, No. 3, pp.114-117.
3 figs.

The author acquaints the reader with an interesting subject of school summer-time activity: the building of a solar barbecue, which makes use of the sun's rays to prepare food. This requires a convex vessel whose shape makes it possible to concentrate the suns's rays into a small area. The basis of the device is a board, size 1.2 x 1.2 meters, which is divided into 16 areas by rays from the center. Each ray has attached to it another square board which has such a shape that its upper edge is equal to one fourth of the circumference of a circle. After these "ribs" have been attached, the inside is pasted over with cardboard. The surface must be a smooth as possible. Over the cradboard a layer of reflex foil /for instance tin foil/ is pasted. With the help of a metal sheet the "focus" of the grill is found and the food to be barbecued is arranged up against a flat surface /wall, etc/. After regular rotation the food is grilled.

11.8

687. VASILEVSKAYA, S.D.: Rabota yunnatov po izucheniyu i okhrane ptits goroda. /The work of young natural scientists during a project for the conservation of birds in the city./

Biologiya v shkole, 54, 1980, No.1, pp.54-56.

The author describes the actitities of a young natural scientist hobby club /for pupils of the 7th class/, who during the summer attended an urban Young Pioneer camp. One of their tasks was to follow the specie composition of the birds found in a city park and to describe their conditions of life. This type of work is always very well accepted and the pupils expressed their great interest in the subject. The project in fact became a field excursion in zoology. The author describes in detail the work the pupils did in groups of

525

2 to 3. They recorded the specie composition of birds and later also of shrubs and trees, nests, etc. They presented their findings in zoology lessons when school openned again.

11.8
688. WESSEL, V.: Lehrpfade von Schülern gestaltet. /A learning trail made by pupils./

Der Biologieunterricht, 16, 1980, No.3, pp.36-70.
4 photos.

The author first deals with the history of science education trails /the first was devised in the US in 1925 in The Palisades Interstate Park, the first in Germany in Bredower Forst in Nauen/. Their didactical value is stressed and the many opportunities they provide for educational use. The author then concentrates on science trails in forests, where he distinguishes a forest trail, a nature trail, a forest nature trail, a green trail, a bird trail, etc. He discusses their site, the objects the trail should countain, rest places, exhibitions, written material about the trail which should be available, guides, etc. Science learning trails should not have any superficial attractions, automats, advertisments, objects made of metal or plastic, etc. They can be devoted to the conservation of predators, the biological combating of pests, nature conservation, environmental conservation, bird conservation, the study of plants, protected animals such as ants, etc. The author describes the building of such a trail, as well as the organization of an excursion to such a trail and how to procede later on in school. The didactical and educational importance of learning trails is stressed.

12
689. DRANSFELD, K.: Prozessgerechtes Planen von Stoffeinheiten- unter besonderer Berücksichtigung der im Unterricht zu analysierenden Prozesse. /The planning of a subject-matter unit - with special stress on processes which should be analysed during instruction./

Biologie in der Schule, 29, 1980, No.11, pp.464-468. 2 tabs.

During biology instruction an analysis of a process is often called for /including biochemical, diffusion, regulation, evolutionary, etc./. Their reproduction is often difficult for pupils and their description may take longer than one lesson. It is therefore necessary to devote special attention to their planning. As an example, the author uses a topic taught in chemistry - chemical reactions. On the basis of making use of interdisciplinary aspects, the author describes how knowledge gained in chemistry can be used in teaching biochemical processes. As a model, such a procedure can be used in teaching evolution in the 10th class. In order to make use of evolutionary laws as a process, the author suggests specific methodological procedures including suitable outlines and diagrams.

12
690. EDGAR, I.T.: Energy education in biology instruction.

The American Biology Teacher, 42, 1980, No.3, pp.182-184.

So far the energy aspect has not been included into biology instruction, in spite of the fact that energy is an important aspects of life. The author discusses this problem in a very interesting manner and provides a number of examples from the life of society. These considerations are important for students as future citizens of the 21st century who will have to deal with these problems.

12
691. HORTON, G. - BRADLEY, J.: A more realistic approach to teaching taxonomy.

The American Biology Teacher, 41, 1979, No.4, pp.230-232. 4 figs.

The author describe a laboratory excercise in taxonomy in which students are given a set of organisms and their tasks is to divide them into groups according to incerasing similarity. Before the excercise takes place the students learn the theoretical aspects of the problem. They then recieve 8 plants and /or animals and printed forms for filling in various data. They work in groups of two or three. The article also contains a classification of plants and animals, where the phylum, class, order, family, genus and specie are distinguished.

12
692. KIEFFER, G.H.: Should bioethics be taught ?

The American Biology Teacher, 42, 1980, No.2, pp.110-113.

If schools are educating future citizens, who through their knowledge will be able to contribute to the functioning of society, the curriculum should include such subjects which in the future will be crucial. Bioethics as part of the biology course is such a subject. Mere knowledge, even if it is extensive and far reaching, cannot solve the real problems with which society is faced. Ethical standards must exist. In the author's opinion, the biology course, which deal with the science of life, should include ethical problems.

12

693. KONONOVA, S.D. - PAVLYUCHENKO, S.Y.: Metodika prepodavaniya temi "Nazemniye biogeotsenozi" v fakultativnom kurse "Vvedeniye v ekologiyu". /The methodology of teaching the topic "Terrestrial Bio-geocenoses" in the elective course "An Introduction to Ecology"./

Biologiya v shkole, 54, 1980, No.6, pp.52-57.

The authors analyse the first six teaching units of the topic, to which a total of 15 lessons are devoted. The article cites the following assignments:

1. The soil as an environment for various groups of organisms:
- a systematization of pupils' knowledge concerning soil formation;
- a demonstration of the variability and extensiveness of life in the soil.

2. The rational utilization of the soil and measures for its conservation:
- a demonstration of the significance of the soil in nature and for the national economy;
- forming a notion of the fertility of the soil and causes for changes in its fertility.

3. Meadows and pasture land - the variability and specific

ecological aspects of organisms found there.
4. An ecological pyramid and the productivity of meadows and pasture land. Their importance for nature and for the national economy.
5. The significance of insects in the ecosystem of meadows and pastures. The need for their regular cultivation.
6. Practical work /2 lessons/ - a study of the specific aspects of meadows and pastures and a study of the specie composition of organisms found there.

12
694. KONONOVA, S.D. - PAVLUCHENKO, S.Y.: *Metodika prepodavaniya temi "Vvedeniye" fakultativnogo kursy "Vvedeniye v ekologiyu".* /The methodology of teaching the introductory topic of the elective course "An introduction to ecology"./ Biologiya v shkole, 54, 1980, No.4, pp.57-61.
3 diagrams.

The introduction to the course is composed of 5 topics, divided into 6 lessons. The aims of individual lessons are the following:
1. The subject-matter and aims of ecology:
- forming notions on mutual relations of organisms among each other and towards non-living nature;
- learning skills in the representation of mutual relations through diagrams;
- formulation of the tasks of ecology.
2. The concept of a bio-cenosis and an ecological niche:
- formulation of notions concerning the necessity of relations between organisms;
- learning skills in the analysis of the adaptation of organisms;
- forming notions on components of a bio-cenosis and niche.

3. Ecological groups of organisms in a bio-cenosis and food chains:
- becoming acquainted with the most important ecological groups;
- forming notions on food relations and skills in their representation in the form of diagrams.

4. Changes in the bio-cenosis, nature conservation:
- acquiring knowledge of the necessity of nature conservation in relation to the scientific and technological revolution.

5. Nature excursion /2 lessons/.

12

695. KOT,W: Bibliografia konspektów lekcji zamieszczanych w Biologii w szkole w latach 1948-1979. /A bibliography of outlines for teaching lessons published in the journal Biologia w szkole during the period 1948-1979./
Biologia w szkole, 33, 1980, No.4, pp.240-245.

One of the main subjects to which the didactical journal Biologia w szkole devoted its attention, were articles devoted to an analysis and preparation of individual teaching lessons in various classes of general education secondary schools. In each issue of the journal at least one such outline and analysis were published, which stressed a given problem from the point of view of the diadactics of biology. The author has drawn up a bibliography of all such article for the period 1948-1979 and classified it according to the type of school for which the lesson was intended and according to individual classes. The list contains a total of 137 items. Each article usually contains the subject-matter of the lesson, an outline of its problems, an analysis of its content and aims from the point of view of didactics and from an educational point of view, the type of lesson, teaching methods used, didactical media used, a bibliography on the subject-matter for the teacher and for pupils, the plan of the lesson, its course, the method and organisation of work, what should be written in pupils' notebooks, homework assignments and various comments. This bibliography is a valuable aid for the proper preparation of a teacher for class.

12
696. BASHKOVA, S. - TODOROVA, S. - MINCHEVA, N.: Fakultativen kurs po bionike v X klas na ESPU. /An elective course in bionics in the 10th class of an experimental secondary school./

Biologiya i khimiya, 23, 1980, No.1, pp.40-46.

Bionics is a science which deals with biological processes and the structure of living organisms, with the aim of discovering new opportunities for solving technical problems and designs.

In experimental secondary schools an elective course in bionics has been introduced, which combines knowledge in bionics and technical design.

The course is planned for 27 lessons, 16 of which are devoted to acquiring new knowledge, 8 lessons to laboratory work and 3 lessons for seminars. The article deals in detail with the division of the subject-matter into various lessons, with practical samples of some lessons and outlines for gaining an understanding of this new teaching subject.

12

697. SZYLARSKA, E.: Rozklad materiału nauczania biologii z higiena w klasiw IV. /Dividing the subject-matter of instruction in biology and hygiene in the 4th class./
Biologia w szkole, 33,1980, No.4, pp.208-216.

On the basis of a preliminary research project the author verified the experimental syllabus for biology and for hygiene in the school year 1978-79 and here makes recommendations for dividing the subject-matter during the whole school year, in the 4th class of a general education secondary school. This division is carried out in the form of a table, where the month, number of teaching lessons and survey of subject-matter is given, together with teaching media, methods and forms of class work.

12.1

698. BORCHARDT, G.: Meinungen und Erfahrungen zum prozessgerechten Planen der Stoffeinheiten. /Opinions on and experiences in planning topic units./
Biologie in der Schule, 29, 1980, No.4, pp.139-140.

The article continues in the subject-matter of a similar article published in this journal /No. 12/1979/. The author agrees with the opinion that specific reserves exist in planning instruction and that there is a direct link between quality planning and the best teaching results. In his opinion it is best to plan for the whole school year, including plans of individual topic units /2 stages in the first term and a third stage in the 2nd term/. On the basis of her experiences, the author demonstrates the planning of a topic unit for 6 lessons in the 9th class /topic 1.1.3/.

12.21

699. GUREVICH, A.A.: Odno iz usloviy povisheniya effektivnosti urokov botaniki. /One of the preconditions for improving the effectivity of botany lessons./

Biologiya v shkole, 54, 1980, No.3, pp.33-36.
2 figs.

The author describes, as an example, how it is best to organize the teaching of the topic unicellular algae, their structure and nutrition /in the 4th class/, with the use of the algae Desmidianceae. After on introduction pupils observe a fresh specimen of the genus Glosterium under the microscope. The teacher acquaints the pupils with the structure of the algae cell. Then the pupils again observe specimens under a microscope and draw the shape of the cell on paper. In the next part of the lesson these drawings are compared with wall pictures of the same objects and in the following discussion the teacher stresses the great variability of algae. For homework, the pupils compare the structure of Desmidiaceae with other specie of algae. This material /Benthos algae/ can be obtained during the autumn excursion, or pupils can look for it during the summer holidays and it can be kept in school until the winter.

12.21

700. **MACKE, C.:** Bakterien als gefährliche und nützliche Dauergäste in unserem Körper. /Bacteria as useful guests in our bodies./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No. 8, pp.243-248.
4 worksheets.

Bacteria are found not only in our environment, but also in our bodies, where a large numbers of bacteria species and large numbers of individual bacteria live. In the majority of cases they are symbionts, but some are dangerous parasites. The author describes the damage done by dental bacteria and those found in other parts of the body. On the other hand, intestinal bacteria contribute to the digestion of food, the formation of some vitamins, etc. The author describes how to deal with this topic in instruction with the aid of worksheets, direct observations and experiments in various organizational forms of teaching. This topic is suitable for the 7th class and higher and can be dealt with in one or two teaching lessons. The factual information provided by the article concerns dental caries /dental decay of bacterial origin/ found in 99% of adults and 70% of ten-yer-old children. The necessity of prevention is explained and how it is done. The author stresses the importance of adding fluorine to drinking water; its purpose is the prevention of the demineralization of teeth. The main cause of dental caries is the abudance of sugar in human food. Other information concerns the importance of intestinal bacteria for the digestion of cellulosis, which could not be digested without them. The human body does not produce cellulase.

Approximately 70 different species of bacteria live in our intestines. They are a source of vitamin B, which is important for the forming of blood, increasing a persons´s performance and strengthening the nervous system and muscles, as well as for increasing the resorption ability of the small intestine and the healing of wounds. Bacteria also participate in the production of vitamin K by the body, which is crucial for the coagulation of blood. One tenth of human faeces are formed by bacteria. The author suggests various suitable observations, the use of transparencies, worksheets and a microscope which magnifies 300 times for distinguishing various types of bacteria.

12.21

701. ALBERT, S.: Die Mistel als Halbschmarotzer. Besonderheiten im Stoffwechsel einer Pflanze. /White mistletoe as a semi-parasitical plant. The special aspects of metabolism in a plant./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.4, pp.118-125.

4 worksheets, 1 tab.

In the 7th class of basic school pupils learn the basics of plant metabolism. White mistletoe is a suitable object on which to study this process. This can be included into the topic "The physiology of green plants". This plant, as a mesotropic hemiparasite, is compared with autotrophic and parasitical plants. The topic requires certain preliminary knowledge concerning photosynthesis. The lesson is based on observations and a study of a mounted mistletoe branch with berries, a study of their cross-sections, as well as slides and transparencies. The mistletoe is studied from systematic, ecological, morphological, physiological and ecological points of view.

12.21

702. BRETSCHNEIDER, J.: Die schematische Darstellung physiologischer Prozesse im Biologieunterricht der Klasse 9. /An outline of physiological processes in biology instruction in the 9th class./

Biologie in der Schule, 29, 1980, No.5, pp.192-195. 4 figs.

Pupils are supposed to gain general knowledge while at the same time developing the ability to make abstractions. This among others, means that when relations are being explained, cognitive models can be used. In this way it is possible for instance to develop the knowledge that the cell is the basic structural and functional unit of living organisms, to develop knowledge on the contradictory nature of assimilation and dissimilation, which are mutually linked, and thus to arrive at the conclusion that in living nature dialectical contradictions exist. The successful teaching of the topic "The metabolism of higher plants" requires a high theoretical standard of instruction. The topic seems exceptionally difficult to pupils. This can be overcome by using diagrams and drawings. The author describes such diagrams of outlines of respiration, photosynthesis, metabolic and transport processes in an autotrophic plant cell and surveys of assimilation, dissimilation and the transportation of substances in a plant. In conclusion various methodological comments are offered.

12.21

703. DANNEEL, I.: Der Wirkung von Hefen und Essigbakterien verdanken wir einige Nahrungs und Genussmittel. /Due to the effect of yeast and acetic acid fermentation bacteria, some foods and eatables are produced./

Naturwissenschaften im Untefricht-Biologie, 28, 1980, No.8, pp.260-269.
5 figs., 3 worksheets, 7 lesson surveys.

The author recommends the teaching of a topic divided into 7 teaching lessons, which deals with the following problems: What is yeast? Baking with yeast, Acatic acid fermentation, The making of wine, Brewing beer, The destillation of cognac, Making vinegar. The following observations and experiments are suggested: the microscopy of yeast, the enzymatic effect of yeast, proof of carbon dioxide formation, the dependence of fermentation on temperature, wine making, proof of alcohol on the basis of potassium carbonate, the function of a ferment stopper, the combustibility of ethylalcohol, the germination of wheat, alcohol distillation. During lessons pupils become acquainted with various product and their technology /on the basis of transparencies/ and with basic chemical equations for respiration, alcohol fermentation and acetic acid fermentation.

12.21

704. FLEISCHMANN, G.: Themenkreis I.: Wie vermehren sich Waldbäume ? Wie wird der Wald verjüngt ? /Group of topics I.: How do forest trees reproduce ? How is a forest rejuvenated ?/

Naturwissenschaften im Unterricht, 28, 1980, No.9, pp. 283-297.
2 worksheets, 9 tabs., 3 subject-matter surveys.

The rejuvenation of the forest is a subject of interest to forestry administrations, those who work in the wood processing industry and those interested in nature conservation. A whole complex of cultivation problems must be dealt with if the rejuvenated forest is to be healthy and a natural nature preserve. The author in his recommendation for this teaching unit provides plans for 5 teaching lessons which aim at giving pupils basic knowledge concerning the forest as a plant community. The present state of the forests is discussed, its positive and negative aspects and also how the findings of modern ecology can be used in seeking solutions to existing forestry problems. The 5 lessons have the following aims: Which of our trees are most important in the forests ? How does a pine tree grow ? How does man utilize the forests ? How can a forest be planted ? How does the forest rejuvenate itself ? The author provides surveys of the subject-matter to be taught and also adds various interesting data on the time when various forest trees bloom, how their fruit is formed, how it ripens, the spreading of seeds, when trees are cut and how the forest is renewed. There are also diagrams of male flowers and the seeds of pine trees, pine cones, pollen, the germination of the pine embryo, etc. Also 2 worksheets for pupils are provided.

12.21

705. KOMANOVÁ, E.: Rostliny cizích zemí ve výuce botaniky v pátém ročníku základní školy I. /Plants from foreign countries in botany teaching in the 5th class of basic school I./

Přírodní vědy ve škole, 31, 1979/1980, No.3, pp.88-89.

Within the framework of the thematic unit "Economically significant plants", pupils are acquainted with a total of 16 species of tropical and subropical plants. The aim of instruction is learn about selected plants whose fruits or other components one imported to this country and either directly consumed or industrially processed. Pupils should gain a notion of the conditions and environment in which these plants are cultivated, harvested and prepared for transportation over long distances.

12.21

706. KOMANOVÁ, E.: Rostliny cizích zemí ve vvýuce botaniky v 5. ročníku základní školy II. /Plants from foreign countries in botany teaching in the 5th class of basic school - II./

Přírodní vědy ve škole, 31, 1979/1980, No.4, pp.122-125.

The article describes widespread plants whose fruit or other parts are imported to this country from tropical or subtropical areas, such as citrus trees, the pineapple plant, the banana plant, the date palm, fig trees the peanut plant, cocoa trees and the tea plant.

12.21

707. KONONOVA, S.D.- PAVLUCHENKO, S.Y.: Metodika prepodavaniya temi"Vodniye biogeocenozi" v fakultativnom kurse "Vvedeniye v ekologiyu". /The methodology of teaching the topic "Aquatic bio-geocenoses" in the elective course "An introduction to ecology"./ Biologiya v shkole, 54, 1980, No.5, pp.45-51.

The article provides a detailed analysis of 6 teaching topics, where topics 3 and 4 each have 2 teaching lessons each devoted to them, while the others take up a single lesson each. The following is a survey of pupils' assignments for each topic:

1. An aquarium as a model of a bio-geocenosis:
- acquiring skills for determining mutual relations among organisms and the causes of disequilibrium in this artificial unit;
- becoming acquainted with rules which must be followed to maintain an aquarium.

2. A freshwater reservoir and its inhabitants :
- demonstrating the dependency of the variability of plants and fauna upon a sum of existing ecological factors /comparison of a natural biocenosis and an aquarium/;
- the specie composition of organisms in a fresh water reservoir.

3. An excursion to a water reservoir:
- becoming acquainted with the variability of flora and fauna and the characteristics of their adaptation to their environment;

- demonstrating the specific aspects of the conditions for life in various groups of organisms;
-collection of material for practical excercises.

4. Practical excercises - studying special aspects of aquatic organisms and their adaptation to life in the water.

5. The negative influence of the incorrect utilization and chemical pollution of the reservoir upon living organisms:
- stressing the significance of natural water reservoirs for man;
- defining conditions whose changes can cause a break-down in the equilibrium of an aquatic bio-genocenosis.

6. Measures for the conservation of water reservoirs and small rivers:
- stress on measures which aim at the prevention of water pollution;
- acquainting pupils with the tasks and activities of "blue watches".

12.21

708. MACKE, C.: Bakterien als Sauchenerreger und ihre Bekämpfung. /Bacteria as the causes of epidemics and combating them./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.8, pp.233-238.
4 worksheets, 1 tab.

The plague and other large scale epidemics no longer exist in our geographical area, but until not so long ago they were still the cause of the death or thousands of people. Science, upon which a number of hygienic measures are based, has driven these disease out of Europe, even if the danger of epidemics is not yet entirely a thing of the past. Case histories of the spreading of septicemic plague and brief biographies of outstanding scientists and their successful struggle against plague form the subject-matter of teaching lessons, which can be included into the biology course, but also into civics or the mother tongue. This topic is intended for the 7th class. Also the positive influence of bacteria on the human organism should be shown. Among the most important negative influences is the spread of epidemics and infections. Special attention should be given to tetanus, dental and intestinal bacteria and to hygiene aspects and the struggle against bacterial disease. The author also provides various factual information, a bibliography and press items concerning the outbreak of cholera, botulism, tetanus, etc. The primary aim of the lessons, however, it to acquaint pupils with the plague as an infectious disease, its places of incidence, spread to other countries and its history in Europe, as well as with the scientists who helped mankind to learn about the causes of infectious disease and thus to find ways of overcoming them. The author deescribes the teaching of this topic in class and in group work.

12.21

709. **MACKE**, C.: Gegen gefährliche Bakterien kann man sich shützen./We can protect ourselves against dangerous bacteria./

Naturwissenschaften im Unterricht-Biologie, 28, 1980,
No.8, pp.249-251.
1 worksheet.

Large scale tourism brings with it important health problems and increases the danger of large scale infections breaking out. For this reason the author provides timely information about this problem and suggests a teaching lesson devoted to the problem, with a number of simple experiments with bacteria which are not dangerous and which surround us. The subject-matter of the topic, as well as practical observations and experiments, demonstrate to pupils the importance of every-day hygienic measures and the necessity of adhering to all hygienic rules and regulations. The topic should be taught in the 7th class and divided into 2 teaching lessons. The author provides data on the increase of infectious disease as a consequence of large-scale tourism, where many people come together in a relative small area /for instance in motels and auto camps/. Flies often transmit bacteria from feaces to food. Pupils can become acquainted with bacteria, the structure of their cells, their reproduction and creation of colonies. Brief information on the worksheet is intended for pupils, who are asked to read it, write out words or terms they do not understand; in conversations with the teacher they can be explained. An experiment with an agar medium serves to demonstrate the presence of bacteria. This requires 3 to 5 days and a thermostat.

12.21

710. **MAYER, J.:** Mikroorganismen des Bodens und ihre Bedeutung. /Microorganisms in the soil and their significance./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No. 8, pp.270-275.
4 figs.

In the soil of a deciduos forest a number of microorganisms can be found which make use of the organic remnants of plants and dead forest fauna which they disintegrate to form humus, water, carbon dioxide and mineral salts; all these substances thus return to the circulation of matter and energy in nature and are again available to plants. The author deals with this topic, which he recommends for teaching in the 8th class. Within this topic also problems of the soil should be studied; also some animals can be bred in the classroom to study the forming of humus in the soil. It is assumed that this subject-matter will later continue to be studied within the framework of ecology. Bacteria is forest soil exist in large equantities: in 1 gram of soil there are approximately 1 billion bacteria who free heat and carbon dioxide into the air. Their activity in forest soil is manifest by their disposal of a large quantity of plant remnants. In tropical forests there are up to 200 tons of plant remnants per hectar of forest. Thus bacteria in such an environment play the role of reducers and are a significant component in food chains and food networks. They process pectin, cellulose, lignin and make a significant contribution to the circulation of carbon. During lessons the following problems are gradually dealt with: humus formation, nitrogen content, the forming of nitrogen compounds, experiments with the combustibility of plant remnants, proof of the presence of organic substances in the soil and especially in the soil found in the forest, observations of degradation processes in dampness and under various temperatures, maceration, the disintegration of pectin, cellulose and xylem. This topic provides opportunities for extensive activities by pupils and the use of observations and experiments as teaching methods.

12.21

711. NAGEL, H.R.: Themenkreis III.: Einige Aspekte des Oekosystems Wald. /Group of topics III.: Some aspects of a forest eco-system./

Naturwissenschaften im Unterricht- Biologie, 28, 1980, No.9, pp.306-319.
10 tabs., 12 figs., surveys of subject-matter.

The author deals with the topics pertaining to the forest as a biocenosis from the point of view of modern ecology. In the course of three teaching lessons he suggests teaching first of all the biocenosis aspects of forests, such as food chains, food networks, food pyramids, the problem of the primary production of the forest bio-mass and biological equilibrium in the forest. These suggested lessons serve as an introduction to a larger unit of topics on the forest as a whole. The author also provides summary tables of the subject-matter in the form of questions, as well as various pictures and interesting information to illustrate the subject and various imuplses for class work. The pictures show the complex relationships between organisms in a forest eco-system, food chains and food networks in the forest ecosystem, a food pyramid and food network in an oak forest and a food chain in a spruce forest. The tables include those concerning the size of the territory of some forest animals, a table which concerns the 115 year development of a beech tree /total number of leaves: $2x10^5$, total area of leaves - 1220 m^2, number of chloroplasts 10^{14}, quantity of chlorophyll - 180 g, evaporation of water per day = 600 l, output of sugar per day - 12 kg/.

12.21

712. NAZADAL, R. and W.: Themenkreis V.: Die Wohlfahrtswirkungen des Waldes. /Group of topics V.: The positive effects of the forest./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.9, pp.329-336.
2 worksheets.

The authors have divided this topic into 6 teaching units for the lower classes of secondary school. Individual lessons concern the following: 1. The forest as protection against catastrophies /2 lessons/, 2. The forest and the climate /1 lesson/, 3. The forest as a place for recreation and health /2 lessons/, 4. The forest as a source of raw materials and energy /1 lesson/, 5. Save the forests! /2 lessons/.

The pupils are acquainted with the significance of the forest, which prevents the pollution of the water-table, prevents floods, soil erosion, falling rocks in mountain areas, as well as landslides and avalanches. The forest has a positive influence on the climate, on temperature and increases the relative humidity of the air; it causes the movement of air and brings fresh air, it absorbs dust particles, decreases the speed of the wind, breaks the force of storms, prevents soil erosion and snow drifts, increases the fertility of cultivated steppe land, provides an area for recreation and a healthy environment for people and it has a positive aesthetical influence on people. The article also deals with nature conservation, conservation of forest biotopes, individual plants and animals, maintaing a gene pool for future cultivated plants and animals for domestication and the conservation of the ecosystem for important biological studies.

12.21

713. NIEMIERKO, M.: Zyplanie i jego ekologie. /Pollination and its ecology./

Biologia w szkole, 33, 1980, No.3, pp. 162-167.
4 figs., 1 tab.

The article discusses the utilization of flower ecology in teaching in the 1st class of a general education secondary school in the biology and chemistry specialization. The pupils become acquainted with flower ecology, with anemophilous and entomophilous plants, with the problem of self-pollination and cross-pollination, with the relation between the wind and insects, with the morphological and ecological characteristics of entomophilous flowers and other organisms, which can pollinate plants, and pollination by birds /hummingbirds/. In conclusion there is a survey of pollination methods and its development in the evolution of flora and fauna, the genetic significance of cross-pollination and the great variety of relations which exist between plants and their pollinators.

12.21

714. SÜCHTERLEIN, H.: Themenkreis II.: Wald oder Forst ? Ueber die Bedeutung von Tieren und Pflanzen im Wald. /Topic unit II: The woods or forests ? The significance of flora and fauna in the woods./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.9, pp.297-306.
5 tabs., 2 worksheets, 2 surveys of subject-matter.

On the basis of the example of a Central European mixed forest /with pine trees and beeches/ and a coniferous forests /with pine grees/ the author carries out an analysis of the stability and lability of living communities in the forest. The foundation of ecological studies is the principle of the relation between the number of specie of animals and plants and the number of individuals of each specie forming a specific community. Also ecological relations such as the relations between predators and their prey, between hosts and their parasites are important. This teaching unit is structuralised in the following manner: the pupils first learn about the formation of a living community of plants and animals and only then do they deal with the relation existing between flora and fauna and the relations between animals /food chains, food networks/.

12.21

715. REINDL, B.: Zur problemhaften und erziehungswirksamen Unterrichtsgestaltung der Stoffeinheit "Bakterien" in Klasse 7. /Concerning the problem of efficient and educationally effective teaching of the topic unit "Bacteria" in the 7th class./

Biologie in der Schule, 29, 1980, No.6, pp.241-248.
2 figs.

For each lesson the author cites its aim, the pupils' assumed previous knowledge, suitable teaching media and a division of the teaching lesson into so-called partial aims. Also the method of carrying out the lesson is discussed. The following lessons are dealt with: The variety and structure of bacteria; the life and nutrition of bacteria; the life and reproduction of bacteria.

12.21

716. SEUFERT, R.: Der Griff des Menschen nach dem Wald. /The intervention of man into the forests./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.10, pp.337-343.
1 tab., 1 fig.

The author further develops the instructions given in the article "The woods or forests" which was published in the preceding issue of this journal. Here he deals in detail with the 4th to 9th teaching lesson, which in the preceding article was dealt with only very briefly. Here the following subjects are developed: the local names of villages and fields and their study as testimony to the historical development of the forests, the causes for the historical losses of forests, the effect of previous exploitation methods on the development of forests, attempts in historical times to maintain the forest, the outcome of historical interventions by man in the forest, the present negative effect of business exploitation of the forests. In individual lessons the following periods should be distinguished: the Neolithic until 3000 B.C; from 3000 B. C. until Roman times /the beginning of our era/; the period of the great migration of Germanic peoples /the 4th to 6th centuries A.D./; the beginning of the Middle Ages /6th - 8th centuries/ and the Middle Ages /10th to 13th century A.D./; the later Middle Ages /13th to 15th centuries/ and the Modern Era. The most important interventions into the forest were deforestation to gain arable land, the cutting of timber to obtain building materials for the construction of towns, for mining and iron mills, as well as glass works. Attempts to save the forests concerned the prohibition of cutting timber and slowing the development of industries using up large quantities of timber and wood, planning the planting of new forests, substituting other materials for wood and using other sources of energy. Because of unqualified interventions, which predominated throughout history, the forests lost much of their best soil, a number of plant and animal species. Today we see a proliferation of pests, an upsetting of the equilibrium in forests and the denudation of areas of the forest as a consequence of the wind and snow. The author quantifies the damage which is being inflicted upon forests in the Federal Republic of Germany.

12.21

717. SEUFERT,R.: Themenkreis IV.: Der Griff des Menschen nach dem Wald. /Topic unit IV.: The intervention of man in the forest./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.9, pp.318-329.
5 figs., 4 tabs.

The author recommends 12 teaching lessons devoted to the history of man's intervention into forests as living communities. Individual lessons are precisely defined and have clearly formulated educational and teaching aims which are summed up in tables. 8 lessons are devoted to the history of man's intervention in the forests: 1. Changes which have occured in the forests as a consequence of changes in the climate; 2. The German landscape before man's intervention; 3. The existing ratio of forests and fields in the contemporary cultivated landscape; 4. A study of local names of settlements, meadows and fields as testimony to the historical development of forests; 5. The causes of the historical loss of forests; 6. The influence of previously used agricultural methods, the use of forest areas for agriculture and losses of forests, 7. Attempts at maintaining the forest in historical times, 8. The outcome of man's intervention in the forest in historical times. The second group of topics is devoted to lessons on the role of industry and industrial societies in relation to forests. Three lessons are devoted to these problems: The contemporary negative influence of obsolete historical economic approaches of man towards the forest; The influence of forests on the development of industry, settlements, and transportation lines, military objects, trade centers, etc.; The burden imposed on forestry by modern industrial societies. The final group of topics is devoted to an observation of the influence of man upon forests. The author provides 5 different alternatives for this lesson, which include an observations of lichens as bio-indicators of air pollution, observation of natural growths of lichens on trees as an indicator of water pollution, the determination of lichens and mapping of polluted and overburdened territories, dust fallout in the vicinity of urban agglomerations and proof of the degree of pollution by sulphur dioxide on coniferous trees.

12.31
718. SCHILLING, N.: Die Photosynthese. /Photosynthesis./

Praxis der Naturwissenschaften-Biologie, 29, 1980,
No.4, pp.97-106.
6 figs.

The author acquaints the reader with the history of the study pf photosynthesis. He describes in detail light reactions in the course of photosynthesis, the Emerson effect, photophosphorylation and the chemo-osmotic hypothesis. Light reactions are the foundation and prerequisite for photo-assimilation of carbon dioxide, which the author describes in detail, the development of a Calvin cycle, the processing of primary products of photosynthesis and photorespiration. A number of diagrams make it easier to understand all these reactions.

12.21

719. SCHOLZ, E.F.: Mensch und Mikroben - die Behandlung des Themas im Biologieunterricht der Sekundarstufe I. /Man and microbes - a teaching topic in biology instruction in secondary school./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.8, pp.225-232.
1 fig., 1 tab., 3 worksheets.

An important topic on microorganisms has now been included into the biology syllabus; it deals with their effect on the human organism. The author has verified the method of teaching this topic and makes his experiences available to other teachers, for whom he provides advice, instructions and information needed for organizing observations and experiments; also a description of possible teaching aids to be used is given. He also keeps in mind the demands made by health education, as well as economic, bio-technical and bio-chemical aspects. A number of interesting facts concerning the significance of microorganisms for man are cited: for instance in salt deposits 200 to 600 million years old live bacteria have been produced out of spores; proof exists that microorganisms existed 3000 million years ago; genes have been found to be the carriers of hereditary information also in bacteria. The total mass of all microorganisms in the world is 20 times larger than that of all other organisms combined. Their activity is apparent throughout the world, plants live on substances which have been freed into the soil by bacteria, etc. Without some bacteria neither animals nor man could live. The author describes the structure of a bacterial cell, which does not have membranes covered with chloroplasts and mitochondria. These cells do not have a specifically shaped nucleus. Escherichia coli has a nucleus apparatus made up of a single long ring-like fibres of DNA. The walls of bacterial cells are permeable for numerous low-molecular substances. These wall are made of mureine /similar to chitine/ which provides the bacterium with support and shape. Different types of bacteria are described /saprophytes, symbionts, parasites/. Bacteria are also described from the point of view of their relation to man - bacteria which are useful and those which are dangerous; human resistance to bacteria, virulence, immunity, and the basic elements of bacteriology - disease in man and animals, damage to food, the possibility of abusing bacteria in bacteriological warfare, etc. There is also a brief survey of the development of bacteriology /Varro, Leeuwenhoek, Müller, Ehrenberg, Cohn, Koch, Fleming, Jahnke, etc./. At present bacteria are an important object for genetics; they make it possible to study mutations and localize genes in relation to chromosomes and to study the structure of genes and their function. The author describes how this topic is dealt with in school syllabi used in the Federal Republic and elsewhere. In the section with practical instructions, various suggestions are provided for student assignments and for class work with bacteria, how to make cultivating mediums, their sterilization, the aids needed for microbiological laboratory excercises, what safety measures must be taken, the vaccination of bacteria, etc.

12.21

720. SCHOLZ, E.F.: Menschen nutzen Milchsäurebakterien in Haushalt und Industrie. /People make use of bacteria for lactic fermentation in the home and in industry./
Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.8, pp.252-260.
1 worksheet, 3 tabs.

The author describes lactic fermentation carried out at home or industrially. This topic can best be dealt with in the 8th class. Instruction is orientated both towards the domestic environment of the pupil and the industrial use of the process in the food processing industry /elements of polytechnical education/. On this basis a number of observations are suggested, as well as experiments and demonstrations which illustrate the subject-matter. The development and spreading of lactic acid in nature is described and the incidence and importance of lactobacteria, streptococci and fungi for the dairy industry. Since 1881 lactic acid is produced industrially in airtight containers out of raw material with a large sugar content /starches/. Industrially made lactic acid has widespread use. The author describes the production of sour milk, butter, cottage cheese, various cheeses and the importance of milk products for the human organism. Pupils become acquainted with the making of sour milk, cottage cheese, yoghurt, kefir, cheese and sauerkraut; they thus learn about the significance of lactic fermentation both in the home and in industry. Also observations and experiments are described.

12.21

721. TENDEL, J.: Wald und Forst. Einführung in das Unterrichtsmodell. /The woods and forests. An introduction to a teaching model./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.9, pp.277-282.

The author submits an introductory article to the single - subject issue of this journal, which concerns the subjet of a forest biocenosis. In this context the author provides a teaching model on the subject of the forest. Various alternatives are given on how to deal with the problem in instruction. A table provides definitions of basic terms which are defined so that pupils will understand them. The topic is divided into 4 groups of problems: 1. Man as the destroyer of the forest, 2. The utilization of the forest by man and its conservation, 3. Energy and the forests, 4. Forests in developing countries. In the whole model the author stresses problems of nature conservation and environmental policy.

12.22

722. ALTMANN, A.: Přizpůsobení se ptáků prostředí. /The adaptation of birds to the environment./

Přírodní vědy ve škole, 31, 1979/80, No.5, pp.166-167. 3 photos.

The article is an example of a methodological instruction to accompany the experimental textbook for the 6th class, called Zoology 6 /published by SPN, Prague, 1978/. It contains the precisely formulated educational aim of the teaching lesson, the method and media to be used, new notions, concepts and terms, as well as logical procedures used in instruction.

12.22
723. ALTMANN, A.: Zajíc polní a králík divoký v nové učebnici Přírodopis 6. /The common hare and the European rabbit in the new natural science textbook Přírodopis 6./

Přírodní vědy ve škole, 31, 1979/80, No. 10, p.371.

The common hare and the European rabbit are described in the new nature studies textbook for the 6th class in a chapter devoted to game. Hares have been placed in an independent order, in accord with the newest literature on the subject - A Survey of Czech Names of Mammals /Dobroruka et al., Lynx, mammalogical reports. New Series, Supplemtum N IV, National Museum, Prague, 1975/. Testimony for the reasons for not including hares into the order of rodents have been provided by facts from phylogeny, anatomy, parasitology, serology, physiology and ethology of hares, as well as a re-assessment of morphological characteristics. The largest number of arguments for placing hares in an independent order have been provided by paleontology.

12.22

724. BADE, L.: Tierwanderungen und Nomadismus. Ein Unterrichtsmodell für die Sekundarstufe I. /Seasonal movements of animals and nomadism. An instruction model for the lower classes of secondary school./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.12, pp.452-461.
4 worksheets, 1 photo.

The author suggests devoting 4 lessons to dealing with the topic "The seasonal movements of animals and nomadism". Within this unit 2 lessons should be devoted to the seasonal movements of reindeer and the nomadism of the Lapps and another 2 lessons to nomadism in the Sahel area of Africa. The author first provides factual information for the teacher on both problems, then describes the course of the lesson and stresses the close links which exist between the climate and seasonal movements of animals and the dependency of man on the animals who manifest these seasonal movements: in both the mentioned areas man is entirely dependent on the animals in question. The author also discusses the far-reaching social changes which have occured in both areas and how gradually nomadism is changing into permanent settlements. The catastrophy which occured in the Sahel in 1968, when famine broke out because rainfall practically disappeared and herds of cattle /mostly zebus/ died is also described and its causes are explained.

12.22

725. BLUME, D.: Ueberlegungen und Vorschläge zum Unterrichtsthema "Tierwanderubgen". /Comments and suggestions concerning the topic "The seasonal movements of animals" as a teaching unit./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.12, pp.425-432.
2 worksheets, 4 photographs.

The reduced number of lessons devoted to biology make it impossible to devote a larger number of lessons to the topic of seasonal movements by animals. The subject can be taught in elective courses connected with biology. Within the teaching of biology as such, this subject-matter must be dealt with within the framework of other lessons on ecological problems. Ecology aspects should be stressed when teaching general biology /seasonal movements of mammals/, human ecology /seasonal movements of fishes and reindeer/, ethological aspects /seasonal movements of birds/, as well as when theoretical problems are discussed /seasonal movements of birds/. Usually this subject matter is easily motivated and is of interest to pupils. Understanding the significance and essence of seasonal movements of animals requires an understanding of horizontal links between various fields of biology as a science. For this reason the problem should be included in the syllabus. A practical understanding of the seasonal movements of animals is important for man's economic activity /seasonal movements of fish, migratory locust/, for understanding ecological factors and the need for environmental conservation and for the prevention of damage to the environment /for instance the seasonal movements of fish and the building of dams on rivers, the pollution of rivers, etc./. In this context pupils should also learn about strategies for the survival of many animal species. Some species by seasonal movements overcome negative conditions existing in the environment. The migratory instinct of animals is usually hereditary, as is the direction of the movement and its formation. Environmental factors act as a triggering mechanism for seasonal movements for many animals. During migrations some life functions of the animal are surpressed /for instance the intake of food/. During migrations, animals pass through various environments. During the teaching of this topic, use should be made of observations pupils can carry out in the immediate vicinity of the school /for instance the migration of birds/. Pupils should become acquainted with scientific methods of studying migrations and seasonal movements and with the history of the study of this subject. In 1886 the zoologists profs. C. Lūtken and O. Winge began to collect material: the bodies of dead birds, who during migration died after collisions with lighthouses. Between 1887 and 1939 a total of 100 000 migratory birds who had died in these collisons were collected and registered. One of the methods of following birds who undertake seasonal movements is their banding, which was started in 1899 by the Danish scientist H.C.C. Mortensen from Viborg. Also experiments with the catching of migratory birds and taking them to another area have been very interesting. At present the seasonal movements of birds are also followed by radar and scientists have studied the influence of hormones on bird migration and their compass system /magnetism of the Earth, the influence of the Sun and stars/. In 1950 the German scientis G. Kramer explained the solar compass which birds use. The theory of a compass based on the magnetism of the Earth was formulated already in 1882, but has been scientifically verified only in recent years.

12.22

726. BROVKINA, Y.T. - REZNIKOVA, V.Z.: Izucheniye temi "Rasprostranneniye zhivotnikh na zemnom share i okhrana zhivotnogo mira". /Learning the topic "The distribution of animals on Earth and the conservation of fauna"./

Biologiya v shkole, 54, 1980, No. 2 ,pp.37-42.

The basic educational and teaching objective of this topic in the 7th class is an extension and generalization of zoo-geographical, ecological and connected knowledge concerning nature conservation, as well as stressing the mutual influencing of animals and their environment, problems of relations existing within a biocenosis and anthropogenic factors; the article deals with 3 teaching lessons, into which this subject-matter is divided in the following manner:

1. Animals of the world and their geographical distribution. Aim of lesson: on the basis of previous knowledge of pupils concerning the classification of organisms, forming a notion of the variety and specie composition of animals living in various terrestial environments, in the oceans and seas and an explanation of their distribution. Methods: exposition, followed by discussion, followed by independent work by groups of pupils /characteristic fauna in various geographical areas/.
2. Natural communities of flora and fauna. Object of

lesson: on the basis of previous knowledge concerning plant communities, to form the notion of natural communities, their system,mutual relations and dependencies and the components formed by man. Methods: Exposition and discussion with use of interdisciplinary relations with geography taught in the 6th class.

3. Conservation of the animal world. Aim of lesson: to generalize the knowledge acquired by pupils concerning the complex nature of mutual influencing which exists between animals and their natural environment and a clarification of the reasons why some species have become rare or extinct,as well as the role of man in nature conservation. Method: A discussion to generalize what had been learnt, culminating in a discussion of pupils′ behaviour in a natural environment.

12.22

727. CALOW, P. - RILEY, H.: Leeches: An adapatational approach to their biology and physiology.

Journal of Biological Education, 14, 1980, No.4, pp.279-289.
4 figs.

The article deals with some interesting topics which include the ecology and physiology of leeches; they are suitable for the upper classes of secondary school. Fresh water leeches can be observed in the school laboratory- British species, their habitat, life cycle, cultivation and feeding in various types of water /soft stagnant, medium hard, hard water/

and their behaviour are described by the authors in relation to using the article for biology teaching in the upper classes of secondary school.

12.22

728. TSVETKOVA, M. - RASHKOVA, S.: Metodicheska razrabotka na uroka "Zhivot v vodata" po yestestvoznaniye v shest klas. /A methodological approach to the topic "Life in water" in the natural science course in the 6th class./

Biologiya i khimiya, 23, 1980, No.5, pp.40-45.

In the article the topic cited in the title is summarized in a table which outlines basic knowledge acquired by the pupils in the 1st, 2nd and 3rd classes and a survey of the teaching aids used, which include:
a/ natural objects
b/ pictures of various types
c/ audiovisual media.
The third column of the table includes topics which continue in what the pupils have learnt in lower classes.

In the 5th class this includes the variety of nature and the conditions needed for the growth and development of plants. In the 6th and 7th classes representatives of systematic classes of animals are taught.

In the 9th class biology course abiotic factors are included, as well as the adaptation of flora and fauna to the environment, the biosphere and man.

In the geography course for the 8th class the topic life in the seas and oceans is linked to this topic.

12.22

729. EWERWALBE-SLOH, E.: Einführung ein und mehrdimensionaler Kausalanalysen im 6. Schuljahr - am Beispiel: Waldohreulen- und Feldmauspopulation. /The introduction of single and multifactoral analysis in the 6th class on the example of the Long-eared owl and the Meadow mouse /vole/./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.2, pp.43-56.
2 figs., 6 worksheets, 1 design of transparency.

The author here deals with an ecological problem which includes aspects of food chains, on the basis of the example of the Long-eared owl and the Meadow mouse which can be found in large numbers, the latter as a field and meadow pest. Their mutual relation in an environment are analysed. This topic is divided into 15 teaching lessons. Of this number, 9 are used to teach basic notions and in the remainder the pupils learn about the laws governing mutual relations between both populations, so-called food competition, and the causes for the rise and fall of populations. The main basis for learning about these relations is an understanding of food relations, food chains and food networks. During each lesson, basic information is provided and the author describes the division of the lessons. Also suggestions for various worksheets for pupils are provided. In them the pupils for instance write their observation of an examination of an owl's pellets, a food network among animals in a grain field, etc.

12.22
730. HAACK, G.: Entwicklung, Gestaltung und Einsatz der Unterrichtsmittelkomplexes"Plattwürmer". /The development, shape and use of the complex of teaching media concerning Plathelminthes./

Biologie in der Schule, 29, 1980, No.2/3, pp.49-62.
10 figs.

For zoology teaching in the 6th class a complex of teaching media have been developed, which in this article are specifically described for the topic Plathelminthes, to which 4 teaching lessons are devoted. The complex is formed of natural objects, models and transparencies. The author also suggests a detailed methodology for classwork, with stress placed on the use of teaching media.

12.22
731. HAHN, M.: Wie sind Vogel und Fisch an ihren Lebensraum angepasst?/How are a bird and a fish adapted to their environment ?/

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.7, pp.193-202.
5 figs., 3 worksheets.

The author describes a teaching project where the pupils on the basis of a study of representatives of birds and fishes learn about their adaptation to two different environments - to life in the water and in the air. Full use is made of activating pupils. For this purpose work with original objects, as well as problem teaching, group teaching, and independent work by the pupil are used. At the horizontal transfer level pupils become acquainted with the shape of the body of these animals, their movement, the mechanism of guiding their movement within the specific environment, while at the vertical transfer level they become acquainted with biological techniques used in school, bionics, etc. Withing the framework of studying this subject-matter the pupils visit the Zöo, where they especially concentrate on the aquarium and cages with birds. Back in school, the findings of the excursion to the Zoo are the subject of group work, where for instance various shapes of a bird's body are described and various types of bird flight, as well as the structure of their feathers. 3 worksheets are provided for these purposes.

12.22

732. HÜNGSBERG-SENZ, U.: Das Fortpflanzungsverhalten des Stichlings. Unterrichtsspiel für Klasse 8. /The reproductive behaviour of the stickleback. A game for the 8th class./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.2, pp.33-39.
2 worksheets, 2 picture tables.

The three-spined stickleback has been chosen for use as a model of an animal in the study of reproductive behaviour and behaviour based on instincts in general. Very good film material is available on this subject. The aim of the teaching project is to teach children basic ethological notions, such as excitation. The author describes the habitat of the stickleback, its way of life, breeding, reproduction, the structure of its body and sexual dimorphism during reproduction. The author also describes in detail the occupation of a territory, the behaviour of the male towards other males, behaviour towards females who are not yet able to spawn, behaviour towards females able to spawn, the building of a nest, the entrance of both male and female into the nest, care of the fertilized eggs, care of fry, the swimming away of the fry and the decline of the instinct to care for the young in the male. In discussions pupils are asked to determine various stages of behaviour and to write them down in the worksheets. The basis for the discussion is the showing of the film. The author describes the whole lesson in detail.

12.22

733. KLAHM, G.: Warum singen die Vögle? Wir untersuchen das Revierhalten einheimischer Singvögel. /Why do birds sing? A study of the territorial behaviour of songbirds./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.4, pp.97-104.
2 figs., 3 worksheets.

It was only ethology, as a modern biological discipline, which discovered the significance of bird behaviour. It makes it possible for a bird to demarcate and protect his territory for nesting and for feeding and thus also finding food for his young and maintaing the specie. The lesson described by the author is planned in such a way that the pupils themselves can participate in the formulation of various ethological concepts and notions; outdoors they observe bird behaviour and its consequences. Only some birds are mute /the white stork/; the majority have their own specific song expression. The syrinx of a bird is found in the place where the trachea divides into two bronchi. It is capable of producing a sound between 70 to 17 000 Hz. The author describes the specific aspects of the structure of a bird's trachea and its voice-box. Song birds have up to 9 special vocal muscles in the syrinx. The author also explains bird singing in connection with sex hormones /testosteronepropionate/ and describes experiments where females recieved injections of this sex hormone or where the loss of singing ability in males occured after their testicles had been removed. Singing has various forms, such as calling, enticing, etc. A bird's singing not only demarcates his territory, but also serves for expressing court_ship, anxiety, fear or warnings. It is an important means of communication. The singing and melody of some birds is inherited, while other must learn to sing. Some birds are imitators, who are able to provide perfect imitations of the singing of other birds. The author suggest organizing an outdoor excursion, which is then used for classwork. An atlas of birds, tape recordings of bird voices, photographs, a compass, stuffed birds and other pictures of birds can all be used in classwork.

12.22

734. KONOPKA, H.P.: Die Evolution der Chordatiere. Eine Unterrichtsreihe für die Sekundarstufe II. /The evolution of Chordata. A teaching lesson for the upper classes of secondary school./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 13., pp.353-367.
6 figs., 3 blackboard sketches.

The author here provides suggestions for teaching a topic on the phylogeny of Chordata. He begins by describing still continuing discussions concerning the development of the Choredata, which are demonstrated on models by Romer, Reman and Gutmann. The subject-matter is divided into 2 or 4 teaching lessons and a detailed description of each lesson is provided, as well as suggestions for pictures and diagrams of phylogenic phylums based the above mentioned three models, to be used in class. The author also includes a bibliography for teachers, on the basis of which they can teach this interesting topic.

12.22

735. PFEIL, H.: Ueber die Fotosynthese. /Concerning photosynthesis./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.6, pp. 186-187.
1 fig.

The photosynthesis of plants is a basic biochemical reaction which makes life on Earth possible. Its basic physical and chemical partial processes are extremely complex and can be understood only gradually. The author in this brief article shows how it is possible to explain the whole course of photosynthesis on the basis of some short-cuts.

12.22

736. PIEKUT, W.: Rozród ptaków. Konspekt lekcji w kl. VII. /The development of birds. An outline of a teaching lesson in the 7th class./

Biologia w szkole, 33, 1980, No.3, pp.185-187.
1 fig.

This outline of a teaching lesson on the development of birds is meant for the 7th class of a general education school. It stresses the independent work of pupils and the skills needed for this. The author analyses the aim of the lesson, the various parts of the lesson, etc. The pupils are required to observe and to work independently with literature on the subject. First attention is concentrated on the fertilized bird egg and the development of birds, the anatomy of their sexual organs, the structure of the egg and other problems. Educational aims concentrate on bird conservation, the protection of bird nests, young birds and eggs. In observations, pupils study the shape, colour, structure and surface of eggs and also their interior content. The development of a bird embryo is also studied. The author provides suggestions for study projects for pupils, as well as questions for examinations.

12.22

737. **RYAN, F.A.:** The world in a classroom.

The American Biology Teacher, 42, 1980, No.6, pp.356-358.
5 figs,

The author discusses the structure of Gothic and Romanesque vaults and their development, as well as the mechanical forces which hold together buildings from the Early and Late Middle Ages, which are still an object of our admiration. In contrast to these vaults he describes the structures produced by a spider, who add static strength to their webs by complex supporting structures which differ according to whether the spiderweb is vertically or horizontally placed. Sketches and outlines document the author's explanations.

12.22

738. **SCHOLZ, E.F.:** Seehunde an der deutschen Nordseeküste. Teilthema der Unterrichtseinheit: im Meer lebende Säugetiere /ab 7. Schuljahr/. /Seals on the German North Sea coast. A topic in the teaching syllabus for the 7th class: Mammals living in the seas./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.7, pp.212-218.
3 tabs., 1 worksheet.

On the northen seacoast of the Federal Republic, in the North Sea, live remnants of a seal population /Phoca vitulina/. Its numbers are, however, continually declining. There are a number of reasons for this decline, which have recently become the subject of serious study aimed at undertaking measures to save these animals. The author suggests devoting one teaching lesson to this subject, where pupils can become acquainted with the seal, the structure of its body, its life, environment, food, reproduction, sensory organs, with seal hunting and with the present size of the seal population on the northern seacoast. The author points to various factors which have distrubed the environment of the seal and which are the main cause of a decline in its numbers. These include remnants of metals and glass found in the water, the eutrophication of coastal waters, phosphate and detergent pollution of the water, the effect of short-term poisons found in the water, as well as acids and lyes, emulgating substances used to deal with oil spills, pestacides, mercury, cadmium, etc. Also the presence of numerous ships of various sizes, tourists, low flying aircraft, ship motors have a negative effect on seals. In conclusion of the lesson the pupils are acquainted with the outlooks for saving the seal population in the Federal Republic.

12.22

739. STIEN, A.: Der Mäusebussard - ein Greifvogel. /The Common buzzard - a predator./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.2, pp.40-42.
Tables with survey of lesson.

The Common buzzard has been chosen as a model for the study of bird predators, within the framework of the topic "Helpers of man in the struggle against pests". The Common buzzard is a daytime predator. Learning about his life and adaptation to the hunting of prey makes it possible to explain the role of predators in the environment and in the animal community. At the same time the pupils become acquainted with the problems of maintaining the environment and biological equilibrium in nature. On the basis of showing a film, pupils can observe the Common buzzard in its own environment. The structure of its body is shown, how it builds its nest, its hunting territory, methods of flying and hunting, seeking out its prey and swooping down on it. The usefulness of the buzzard is fully documented and various stages of its hunting are studied. For homework, pupils look up other bird predators and owls.

12.22

740. WERTER, E.: Die Eichengallwespe. /The gall wasp./

Naturwissenschaften im Unterricht-Biologie, 28, 1980,
No.10, pp.206-208.
1 worksheet.

The authors have chosen the gall wasp as suitable for research work with a biological object. On this basis it is possible also to study another very interesting and frequent phenomenon found in nature - the forming of galls. The life cycle of the gall wasp is described, as well as the forming of galls and instructions are provided for carrying out outdoor observations. Galls can best be collected in June and the topic can be taught after the summer vacation. The author describes the course of 8 teaching lessons where worksheets are also used.

12.22

741. ZUCCHI, H.: Das Thema "Insektenwanderungen" im Unterricht der Sekundarstufe I. /The topic "The seasonal movement of insects" in teaching in the lower classes of secondary school./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.12, pp.445-452.
1 fig., 3 worksheets.

The topic cited in the title does not yet form a part of the teaching syllabi used in the Federal Republic, but it is recommended by the author in view of its biological and ecological importance and suitability for classwork /insects through seasonal movements are able to adapt to periodic dry spells, to lower temperatures, etc./. For classwork, the author suggests using transperencies on European migratory butterflies such as the Red admiral and others, using worksheets and tables for work on the migrational behaviour of insects /the locust/. He also suggest using 4 teaching lessons for this purpose in the 7th or 8th class. Also methodologic - al instructions are provided concerning individual lessons and their preparation. As aids, living objects, collections of mounted insects, slides and school films can be used. At least one nature excursion should be organized within the framework of this topic. In conclusion the pupils can prepare a small exhibition on the subject .

12.23

742. BLUME, D.: Baustein 8. Das Anpassungsverhältnis zwischen Mensch und Umwelt. /Constribution 8. The adaptation relationship between man and the environment./
Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.11, pp.398-406.
2 figs., 1 tab., 2 worksheets.

An 8 lesson unit within the framework of the topic "The phylogeny of man" is devoted to the problem of man's environment and the adaptation of man to this environment. At the beginning of his phylogeny, man was passively subject to the Darwinian evolutionary mechanism, but from a certain point onward it is man who adapts the environment according to his needs. This turning point was made possible above all by selection and the transmission of experiences, inventions and discoveries. Thus during his evolution man has himself influenced his own development /the cultural revolution/ . Language, writing and images have a played an important role in this cultural revolution, and this in turn has led to extended communication, a division of labour, cooperation, the use of technical media, the planning of work and the rise of tradition. In recent times even the landscape is being formed as a human environment.

12.23

743. BLUME, D.: Baustein 9. Mechanismus und Problematik der kulturellen Evolution-Einführung dieses Begriffs. /Contribution 9. The mechanism and problems of cultural evolution - the introduction of this notion./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.11, pp.406-411.
2 worksheets, 1 tab.

The concluding article in a series concerning the teaching of human evolution. Here the author introduces the concept of cultural evolution which is compared with the evolution of man. In the course of cultural evolution man has adapted the environment to his own needs. This process is compared to the whole evolution process of man and the accelerating impact this cultural evolution has had on man's evolution. Because at the same time and on a parallel basis, selection pressure continues to exist, differentiated hereditary adaptation takes place in the same form as before the beginning of cultural evolution and the changes in the environment which occured as its consequence.

12.23

744. COOK - FUSSEY - SUTTON: Human demography in ecology teaching.

Journal of Biological Education, 14, 1980, No.4, pp. 299-302.
2 tabs.

One of the problems of teaching the dynamics and genetics of a population in relation to development is the collection of data concerning mortality. The authors describe a method for obtaining such data. Tables are provided which illustrate the large differences which exist in this respect in relation to sex, social class and locality. Students can collect such data themselves, especially in a smaller community. On the basis of the collected data various demographical conclusion can be made.

12.23
745. FAGRIZII, S.: Kenntnisstand und aktuelle Probleme der Hominidevolution. /The state of knowledge and current problems concerning the evolution of hominids./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 7, pp.193-209.
10 figs., 18 tabs.

The author provides a brief survey of the state of knowledge and current problems concerning the development of the hominid family and the fossile testimony to this development. This is based on a survey of important findings of man's ancestors, which are accompanied by pictures of skulls and other bones and maps of where they were found. Bi-pedal anthropoides have been known to exist in the Miocene and Pliocene. The development of this suborder is here followed from monkeys up to hominids and man in the course of 35 million years. The author stresses the characteristics impertant for the development of man. Among them are the size and content of the brain case. A new opinion concerns the very wide distribution of some hominids such as Homo erectus /the author considers 9 sub-species/. With Neanderthal man he mentions three types: pre-sapient Neanderthal man, pre-Neanderthal man and the classical Neanderthal man. In the author's opinion the developed forms of hominids such as Homo erectus and pre-sapient Neanderthal man can be considered the direct ancestors of man. The article is addressed to teachers in the upper classes of secondary school. The interpretation of fossil records is generalized and the author avoids hypotheses which are not sufficiently substantiated. The picture tables, photographs and maps of distribution of man's ancestor are very valuable for teaching.

12.23

746. FAHRNBERGER, G.: Baustein 1. Die Menschen sahen früher anders aus als heute. /Contribution 1. Man in earlier times looked different than he does today./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.11, pp.371-375.
3 figs., 2 worksheets.

On the basis of the example of Neanderthal man and his environment the author demonstrates the method by which contemporary science is able to reconstruct man's past. Such reconstructions are based on findings of bones, tools, weapons, decorative objects, remnants of human settlements, etc. However, in most cases such findings require extensive supplements and thus every reconstruction of man's past contains a number of hypothetical aspects. Scientific methods make it possible to carry out such reconstructions in spite of the fact that no one has ever seen a prehistoric hominid. On the basis of various finds it is also possible to reconstruct the way of life and behaviour of our ancestors. The author bases teaching on the use of worksheets, slides and transparencies. Also a film on the subject is available. The pupils are shown a scene from the life of Neanderthal man living 100 000 years ago. Pupils are then given assignments where they describe what they have seen, learn about the distribution of Neanderthal man in Europe, Asia and Africa, about classical Neaderthal man and the structure of his skull and body. One worksheet provided concerns cutting out various parts of the skull and pasting it together, another makes comparisons between the body and facial structure of a Neanderthal man and contemporary man. The differences determined are summed up in a table. Also various tools and weapons used by prehistoric man are compared and classified. In the course of teaching also the history of these finds are examined, as well as Virchow's error in the the assessment of man's ancestors and contemporary literature on the subject. In conclusion of the lesson the problems are summed up and the possibilities of correctly reconstructing prehistoric man are evaluated.

12.23
747. FAHRENBERGER, G.: Baustein 5. Einführung einer Zeitleiste.
/The introduction of a time curve./
Naturwissenschaften im Unterricht, 28, 1980, No.11, pp. 387-390.
2 figs., 1 worksheet.

The 5th topic of the teaching unit concerning the evolution of man is devoted to a comparative study of 5 of man's ancestors: Australopthecus, Pithecanthropus, Steinheim man, Neanderthal man and Cro-Magnon man. The pupils learn the distinguishing marks of these ancestor of man, the characteristics of their skulls, the increase in the size of the brain case, the reduction of the facial part of the skull, the reduction of the brow ridge, the disappearance of the slanted forehead and the forming of the chin. On the basis of this information pupils are able to carry out comparisons of man's ancestors and with the aid of picture charts and a worksheet they are able to design a time curve denoting various developments in the evolution of man. Also other changes in the structure of the body are studied, such as the upright posture of man, changes in body posture and the holding of the head and changes in the proportions between body height and the length of the extremities. Also the way of life and the use of tools of man's ancestors are studied.

12.23

748. FAHRENBERGER, R.: Baustien 7. Stammbaum des Menschen. /Contribution 7. The evolutionary tree of man./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No. 11, pp.393-397.
1 fig., 2 worksheets.

In this teaching lesson the teacher continues to develop basic knowledge concerning the phylogeny of man. First the principle of describing this development with the aid of a tree diagram should be explained. It is a hypothetical diagram. The growing amount of finds fill in our knowledge and makes it possible to make our hypotheses more precise. Pupils can be given a blind evolutionary tree with a rough designation of time and given the assignment of filling in man's various ancestors. Thus various concepts and terms are visualized and this improves learning. Cro-Magnon man is considered to be man's immediate ancestor, while Neanderthal man is considered to be a blind side line of development.

12.23

749. FAHRENBERGER, G.: Baustein 6. Stammt der Mensch von Affen ab ? /Contribution 6. Is man decended from the monkeys?/
Naturwissenschaften im Unterricht-Biologie, 28, 1980, No. 11, pp. 391-393.
2 figs., 1 worksheet.

This 6th article on the phylogeny of man is devoted to the question of whether man is the decendent of monkeys. Man's ancestors, which were taught in lesson no.5, are compared to a chimpanzee. The differences and similarities determined should be used to express a degree of relation. A chimpanzee and contemporary man both have a common ancestor, who lived approximately 20 to 25 million years ago. The chimpanzee has undergone its own evolution and thus the ancestors of both differ. In conclusion a summary is provided concerning present day anthropoids -chimpanzee, gorilla, orangutan - which all have a common ancestor with man, who lived 25 million years ago.

12.23
750. GUMMELT, G.: Zum aktuellen Thema. /Concerning a timely topic./

Biologie in der Schule, 29, 1980, No.11, pp. 479-480.

This article on the topic "Respiration" contains not a single superflous sentence. The pictures are of very good quality and a number of opportunities for motivating pupils, as well as demonstrations by the teacher and activities carried out by pupils are provided. Some parts are a little too difficult and greater use should be made of opportunities for applications and the systematisation of knowledge.

12.23
751. HASS, G.: Zur praxisrelevanten Unterrichtsgestaltung der Stoffeinheit "Erregungsübertragung an Synapsen". /The methodology of the topic "The transmission of excitation throught the synapses", relevant to practical use./

Biologie in der Schule, 29, 1980, No.6, pp.230-244.

Among pupils in the 12th class it is possible to develop previously gained knowledge from the 8th and 9th classes; but the problem of the transmission of excitation through the synapses requires an explanation from the beginning. The teacher has only 1 lesson available for this purpose, and in the author's opinion, based on many years of experience, this time is sufficient for the purpose. The author analyses in detail the methodology of such a lesson. He begins with motivation and continues by explaining the laws governing this process.

12.23

752. KLEE, I.: Baustein 4. Lebensweise des Neandertalers. /Contribution 4. The way of life of Neanderthal man./

Naturwissenschaften im Unterricht, 28, 1980, No.11, pp.383-386.
1 fig., 1 worksheet.

The author here submits the 4th part of the topic on the phylogeny of man for the lower classes of secondary school. The pupils are acquainted with the very difficult conditions of life of Neanderthal man during the Ice Age with its very brief summer, living at the edge of the continental glaciers. During the lesson the pupils first become acquainted with the geographical distribution of finds of the remnants of Neanderthal man and the range of glaciation at this time. The conditions in which Neanderthal man lived are then compared with those existing in the contemporary tundra and taiga. In conclusion a survey of findings concerning Neandeerthal man is given and a survey of his life style. The lesson can be supplemented with the worksheet which contains maps of glaciation and finds which the pupils can fill in . Also the flora and fauna of the period is the subject of learning.

12.23

753. LEPEL, W.: Einige Hinweise zur Behandlung der Reflexe im Klasse 8. /Several instructions concerning the teaching of reflexes in the 8th class./

Biologie in der Schule, 29, 1980, No.11, pp.468-471.

Visits to classes by school supervisors have indicated that teachers have problems with the topic "conditioned" and "unconditioned" reflexes. This is also the fault of the textbook and methodological handbook. An essential characteristic of a reflex is that it is unconscious. Thus it is first necessary to distinguish between conscious and unconscious movements or reflexes. The term conscious and unconscious reflex should be subordinated to the term reflex; a common characteristic of both is that they occur unconsciously, the difference between them concerns their permanency and localization in the brain. The author cites examples of reflexes and their significance /defensive and protective reflexes, reflexes connected with the intake and digestion of food, a number of conditioned reflexes/. In conclusion, the author discusses learning from the point of view of reflexes.

12.23

754. LODENKEMPER, H.: Anthropologische Aspekte des naturwissenschaftlichen Unterricht. /Anthropological aspects of teaching the natural sciences./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.3, pp.89-92.

The findings of pedagogical anthropology have been studied and used in other natural science disciplines such as mathematics, biology, physics and chemistry. The author explains the importance of anthropological studies and anthropological data for various fields of natural science. Mathematics help man to calculate structures, bridges, flights to the Moon and other planets of the Solar system and in the didactics of mathematics, anthropological knowledge makes it possible to mediate culture technologies, while in biology anthropological findings make it possible to understand the structure and function of animals; in physics and chemistry anthropology contributes to an understanding of the laws of nature. At present biology cannot do without mathematics, physics and chemistry. Teaching the natural sciences should also explain the status of man in nature, the possibilities open to man in changing nature, while mathematics and the other natural sciences help to do away with the pressures which nature exerts on man: the pressures exerted by man on nature are becoming the greater problem today. The danger of a world-wide war is the greatest danger of all.

12.23

755. MACKE, C.: Aktive und passive Immunisierung - dargestellt am Wundstarrkrampf. /Active and passive immunization - shown on the basis of tetanus or lockjaw./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.8, pp.239-243.
3 worksheets.

The most effective prevention of the most dangerous bacterial disease at present is protective vaccination. The author here describes tetanus/lockjaw/ on the basis of which he explains protective vaccination and its significance in combating this mortally dangerous disease. While it is true that tetanus is a rare disease, 50% of those who contract it, die. It is thus one of the most dangerous bacterial infections. The author provides a methodology of explaining the difference between active and passive immunization. The aim of the teaching lesson is to make pupils aware of the fact that even the smallest wound requires attention and proper care. 80% of all those who contracted the disease did so through very small wounds. In the Federal Republic every second case of tetanus is mortal. The period od incubation is between 4 days and 4 weeks. The disease effects the central nervous system. The tetanus germ is exceptionally resistent, its spores exist for years in the air, but only in an anaerobic environment does the spore germinate and reproduce. Thus deeper wounds are more dangerous for this disease than surface wounds. The germ produces a poisonous ectotoxin. The author also describes the rise and development of the disease, the development of a fixed spastic sardonic smile and other symptoms - urinal retention and constipation, a ridgid abdominal wall, early excitation by light and sound, painful spasms. Also methods of treating lockjaw are described. With passive vaccination, immunity is maintained only for several weeks, with active immunization for 6 years. The course of the lesson is described, as well as its teaching and educational objectives. Pupils should be shown a transparency concerning lockjaw infection and the creation of anti-bodies, as well as active and passive immunization. Also the use of a film is recommended. In conclusion a survey of basic terms is provided.

12.23

756. SCHNEIDER, H.: Die Einheit von biologischer und kultureller Evolution. Demonstriert an Unterrichtsbeispielen zum frühen Werkzeuggebrauch. /The unity of biological and cultural evolution, demonstrated of the example of teaching about the early use of tools./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No. 3, pp.65-81.
8 figs.

The author suggests the topic "The biology of the technical and cultural development of man" as a suitable topic unit for teaching. The topic includes two streams where functional and morphological problems are defined which the pupils solve on the basis of observations of their own bodies and making comparisons with pongidae. The teaching plan demonstrates to pupils the complex and total nature of man's evolution and his contemporary technical skills which are the outcome of biological evolution. This leads to a better understanding not only of human evolution, but also the development of technology since prehistoric times until the present. The topic is recommended for the 9th and 10th classes of secondary school. The author provides worksheets for various assignments. The article is concluded with facts showing that the development of technical skills was possible only on the basis of biological evolution.

12.23

757. SCHUSTER, M.: Reagenzglasbegruchtung und Embryotransfer bei Säugetieren und beim Menschen./Test tube fertilization and the transfer of the embryo to mammals and/or man./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.11 , pp.338-341.
3 figs., 1 transparency design.

The article provides information on the present state of knowledge concerning fertilization in a test tube and the transfer of the embryo from the test tube to the body of a mammal or woman. This new method is beginning to be used in animal breeding, as well as in human medicine. A transparency facilitates explaining the problem in class. In animal breeding, "test tube calves" have been produced and in human medicine so-called "test tube babies". The author suggest including this topic into biology teaching so as to bring the course up to date and thus provide pupils with serious information on the subject. Fertilization in a test tube and transfering the embryo is sometimes also called in vitro fertilization or extra-corporal fertilization. So far, best results have been obtained in mice. The author also explains the methodology and technique of this modern intervention on the basis of the example of mice. Eggs from a female mouse are taken when the mouse is 8 weeks old; with the aid of the hormone gonadotropin the eggs are brought to a state of superovulation, during which not only a single egg, but 20 or 30 eggs mature. 24 hours after the last injection of gonadotropin,the eggs are in the Fallopian tube, from where they can be taken and transmitted outside the body. Sperms are obtained directly from the epididymis of the males or after copulation from the vagina of the female. Fertilization takes place in a test tube. If sperms from the vagina are used, 60% of the eggs are fertilized, if sperms from the epididymis are used, 90% of the eggs are fertilized. 25 hours after fertilization of the egg the two-cell stage of the embryo appears. At this stage the embryo is transfered to a special cultivating medium, which must be replaced every 6 hours so that constant pH values are maintained, as well as constant osmotic pressure, aminoacid concentration, protein content and the temperature of the medium. A gas is brought to the cultivating medium /95% air and 5% carbon dioxide/. The mouse embryo develops in the medium up to the stage of 32 cells. Then it is transfered into the vagina of a mouse. One out of four embryos thus implanted continued to develop. The embryo need not be implated into the same female from which the eggs were taken. The immunological system of the embryo in the early stages is not yet capable of functioning and thus no immunological reaction takes place. Transfers between species /between a mouse and a brown rat/ have not, however, been successful. When the embryo is implanted into the kidney, it causes a tumor to grow in the mouse /a teratom/. The embryo does not seem to suffer from the transfere. Fertilization in the test tube serves, among others, to study the effect of alien substances on the development of the embryo /chemicals from the environment can be tested, as well as carcionogens, mutagens and medicines, as well as their effect on the embryo/. Fertilization in a test tube can solve the problem of having a child for infertile woman. In the Federal Republic approximately 100 to 200 000 women are unable to have children, usually because their Fallopian tubes have become obstructed due to inflammations. In man, the embryo must be implanted in less than 70 hours after fertilization into the vagina of the future mother. In 1978 a total of 800 experiments were undertaken with implantation /especially by the British scientists Steptoe and Edwards/. Only in three cases were healthy babies brought to term and born.

12.23
758. Stoffeinheit "Einführung", "Atmung". /The topics "Introduction" and "Respiration"./

Biologie in der Schule, 29, 1980, No.7-8, pp.295-314.

The article is a sample of the text found in a new methodological manual for biology teaching in the 8th class; it includes didactical instructions concerning the position of man in nature and society, a survey of the structure and functions of the human body and respiration. Each topic is divided into a number of lessons, where objectives of the lesson are cited and suggestions made concerning the course of the lesson. /Stress in placed on the activities of both pupils and teachers/. Also a list of terms and notions, which the pupils had learnt earlier and will need to recall and of new terms, is provided and suggestions for blackboard drawings.

12.23
759. TAUSCH, J.: Die Bedeutung der Verhaltensbiologie für den Unterricht in der Hauptshule. /The significance of behavioural biology for teaching in basic school./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.5, pp.131-138.

The author discusses the problem of ethology /or behavioural biology/ in the school biology syllabus. He has found that this very important branch of biology is included only in some syllabi, and in an insufficient range, in view of the importance of the subject. A lack of understanding of some ethological aspects of babies and toddlers can lead to grave negative consequences, disturbed development and defects of social behaviour, due to faulty mother-child relationships. Such defects can lead to the faulty development of static functions, manual skills and intelligence. In the Federal Republic approximately 600 000 mothers with children under three years of age are working and pre-school aged children have every third mother working, so that large numbers of children are not recieving maternal care. For this reason this topic, concerning threatened children, should be included into the syllabus. The author cites suitable examples from ethology which are presented as methodological problems; he also deals with the biology of the memory and the biological foundations of learning, in connection with the behaviour of infants and toddlers. In conclusion the necessity of including some ethological topic into the biology syllabus is again stressed.

12.24
760. BENNETT, J.: Building a cell.

The American Biology Teacher, 42, 1980, No.9, pp.518-528, 533.
5 figs.

The cell is the basic structural unit of all living organisms and the function of the cell is one of the most important integrating topics in biology. The author offers outlines to illustrate the mutual dependency of protein and nucleic acids in hereditary functions. Finally, an outline called "The hereditary system" is presented, which is the outcome of making more precise the preliminary simpler outlines available before, on the basis of questions and answers provided by the students. The procedure is indicated in pictures which are accompanied by extensive commentaries and 2 tables. The article contains instructions for a number of alternative systems developed by the author.

12.24

761. BOJUNGA, W.: Zum Unterricht über Evolution auf Sekundarstufe I. /On teaching evolution in the lower classes of secondary school./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.11, pp.369-371.

The evolution of organisms is first taught in the lower classes of secondary school. This subject - matter brings with it a number of problems. The extremely long period of time in which evolution takes place and a lack of original objects /with the exception of some fossils/ or at least their models make teaching difficult. For this reason the journal has published a whole issue on this subject, devoted to problems of teaching evolution in school. It has been found that 80% of pupils in the secondary school had never encountered the term evolution and that many of them participate in religious education; for these reasons this subject is very important. In many cases conflicts arise between creationism and evolutionary theory.

The author suggest including this subject matter in the 7th, 9th and /or 10th class, depending on how complicated it is. It can be divided into 9 teaching lessons. The aim of this teaching is to explain that man has not been created, but rather that he has evolved in a long evolutionary process.

12.24

762. BRUMBY, M.: Problems in learning the concept of natural selection.

Journal of Biological Education, 13, 1979, No.2, pp. 119-122.
2 tabs., 1 appendix.

A group of college students in their 1st year courses, who had undergone extended biology courses in secondary school, were given written tests to determine the extent to with the students understood the concept of natural selection. It was found that only 18% were able to apply this concept to generalized problems concerning the environment. The basic error most students made was the fact that in place of the concept of "evolution" on the basis of natural selection they formulated a theory of "adptation through induced mutations". By further analysis it was found that most students have a meagre understanding of the terms adaptation, immunity, the development of mutations and the laws of heredity. The main cause of these errors, in the opinion of the author, is the fact that students derive evolutionary changes in the population from changes which occur during the life-time of an individual. The sample of a test which was used in the project is attached to the article in the form of an appendix.

12.24
763. DREYFUS, A. - JUNGWIRTH, E. - BROZA, J.: Designing a teacher´s manual: a client centered approach.

Journal of Biological Education, 13, 1979, No.2, pp. 127-132.
1 tab.

The article deals with problems encountered in designing manuals for teachers, which would help him to make well reasoned decisions, while taking into account the teacher´s experiences and intellectual self-respect. The method described concerns independently formed materials, which are not based on any specific syllabus or curriculum, so as to allow the teacher to make the final decision concerning final adjustments and use. A project was undertaken, where from a representative group of teachers basic information was acquired concerning the newly introduced group of laboratory excercises in genetics for older secondary school students. During the project, questionnairs were administered and interviews with respondents organized. The questions asked in the interviews are divided into 12 groups, which are described in detail in the article, as well as their assessment.

12.24
764. DYLLA, K.: Scheehase - Feldhase - Art oder Rasse ?
/The Blue hare and the Common hare - different species or varieties ?/

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 1, pp.11-15.
3 figs., 1 photo.

Problems concerning the blue hare and the common hare can be suitably use in teaching evolution. Are these two animals separate species or only geographical varieties? The author points out how this problem can be solved on the basis of the definition of a specie and geographical variety, population dynamics and on the basis of factual information concerning both animals. Hares at present form a small systematic group, which is however, distributed almost all over the world and had been very important in the course of evolution. Various species are described /the Common hare, the Blue hare, the European rabbit, the Cape hare/. A table shows the morphological differences between the Blue hare and the Common hare, and provides information on various varieties of the Blue hare. Cross-breeding between the Common hare and the Blue hare usually produces infertile individuals. Nevertheless, both species are very close to each other. The Blue hare probably developed in the middle Pleistocene and thus has been existing as a specie for 2 million years. During the Ice Age it become adapted to cold weather; during this period it was among those animals who lived in areas which were not permanently covered by ice. When glaciation receded the Blue hare advanced from south to north, or from lowlands into mountains. The communication system between both species has deteriorated but has not disappeared completely. The infertility of cross-bred animals, or their decreased fertility indicates that the exchange of genes has been strongly limited. In solving these problems the pupils become acquainted with such terms as glaciation, mutations, selection, isolation, adaptation to an environment, relicts, convergence, Bergmann's rule, specie, sub-specie, geographical variety and population dynamics.

In conclusion the author recommends a discussion in class where it is made plain that the Blue hare and the Common hare are two separate species.

12.24

765. FAHRENBERGER, G.: Baustein 3. Altersbestimmungen bei Versteinerungen. /Contribution 3. Determining the age of fossils./

Naturwissenschaften im Unterricht, 28, 1980, No.11, pp. 379-383.
2 figs., 1 tab., 1 worksheet.

The author briefly describes various scientific methods for determining the age of fossils. Essentially the age of the rock in which it is found, especially so-called index fossils for a specific geological period. Determining the age of a fossil is relative, but some methods allow a more precise determination of the fossil or rock age, for instance the method of radio-isotopes of some elements, where their half-life of decay is known /the loss of half of the atoms of a radio-active element/. With Uranium 238 this half-life is approximately 4.5 billion years. On the basis of radio-active methods scientists have been able to date the oldest remnants of animals and plants, which lived 2.7 to 3.4 billion years ago. Another method is based on Potassium and Argon with a half-life of 1.3 billion years. These methods are suitable for remnants which are older than 500 000 years. A method based on radio-active Carbon C^{14} makes it possible to determine the age of plants and animals living approximately 70 000 years ago. Younger findings can also be dated according to their fluorine content. The amount of fluorine found in bones from the beginning of the Ice Age, i.e. approximately 60 000 years ago, equals 3-4% while at the end of the Ice Age only 1%. Among other dating methods the author mentions the Tritium method, the Ionium-Radium method, the Potassium-Calcium method and the Rubidium-Strontium method. The subject-matter of this lesson requires some knowledge gained in physics and chemistry, so that the lesson implements interdisciplinary relations.

12.24
766. GROCHOWSKA, E.: Poglady na naturęgenu i istotę jego działania. Konspekt lekcji dle kl. IV. LO. /Opinions concerning the nature of genes and the essence of their effect. The outline of a teaching lesson in the 4th class of general education secondary school./ Biologia w szkole, 33, 1980, No.2, pp.98-101.

The subject of this teaching lesson can be found in the syllabus for the 4th class with an extended course in biology and chemistry. It is part of the topic "The variability and heredity of organisms". The lesson dealt with in the article discusses the opinions of contemporary authors on the essence of the gene and the methods by which it functions. The author recommends using 2 teaching lessons for this purpose. During the first she recommends analysing the relation between genes and enzymes, while in the second lesson heredity. The aim of both lessons is to form a scientific world outlook, as far as heredity phenomena are concerned, and comparing classical and contemporary opinions concerning the essence of the gene. Stress is also placed on acquiring skills for the interpretation of scientific findings in biology, carrying out logical operations and the formulation of conclusions. Teaching media recommended include diagrams of DNA structure, of the synthesis of proteins, drawings in the textbook and slides. The author also recommends using problem teaching to achieve an understanding of Mendel, Morgan and more modern findings in the work of bio-chemists and gentists. She also provides a detailed analysis of the teaching lesson, which includes the following problems: the significance of DNA, the transmission of genetic information, the characteristics of DNA, transformations, transductions and problems concerning a definition of a gene on the basis of contemporary opininions concerning its structure and function.

12.24
767. KLEE, I.: Baustein 2. Fossilierung. /Contribution 2. Fossilisation./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.11, pp.376-378.
Worksheet.

Fossils are the subject of study of paleontology. This article describes how fossils are formed. They are found only in sediments. The finer the grain of the sedimentary material, the better the petrification of the fossil. The conditions for fossil formation can be imitated experimentally. The objective of the teaching lesson described here is to acquaint pupils with the development and significance of fossils for science and for solving problems of the evolution of organisms on our planet. During teaching, pupils learn about the most important places were fossil are found /quarries, sand pits, gravel pits, exposed rock sediments/ in the vicinity of the school and the conditions which make fossilisation possible. Also freezing an object in permafrost makes it possible to preserve an organism. During the lesson such terms as fossil, contemporary, sediment, rock, exposure, petrification are explained.1 worksheet for use by pupils is provided.

12.24
768. LATTIMORE, B.: *Evolution and the philosophy of science*. The Australian Science Teachers Journal, 24, 1978, No. 2, pp.130-135.

In this article the author provides supplementary material for biology teaching in the 12th class, within the framework on the topic "The substance of life". In the author's opinion both neo-Darwinism and the problems it has not yet overcome should receice objective treatment within the course of teaching, usually on the basis of some supplementary theory. He first acquaints the reader generally with evolution theory and some of its theorems. He then offers broader comments on some of the philosophical aspects of evolution theory and the opinions of various other authors concerning this subject-matter. The importance of fossil findings for evolution theory are mentioned and the opinion expressed that evolution is in fact the philosophy of life. Alternative theories by some authors /for instance S. Kammerer and A. Koestler/

are described. The author also provides a survey of the most important creation_ist and evolutionary theories and in conclusion provides students with several topics for discussions on the problem of the rise and development of life on Earth.

12.24
769. REUTER, C.: Einige Empfehlungen zur Stoffeinheit 1. 3. Mendelsche Gesetze" in Klasse 10./Some recommendations concerning topic unit 1.3: "Mendel's laws" in the 10th class./

Biologie in der Schule, 29, 1980, No.12, pp.507-508.

During visits to the classroom, the author has found that when Mendel's laws are being taught, very seldom is a problem approach used for achieving an understanding of the most essential equations. In the course of teaching the author herself also uses experiments, which make it easier for pupils to understand that these laws are of a statistical nature. She uses 100 red and 100 while beads to demonstrate the distribution of alleles in snap-dragons.

12.24
770. SACHS, H.: Zur Behandlung des Themas "Biomembranen" innerhald von Kursen des Sekundarbereiche II. /On developing the topic "Biomembranes" in courses in the upper classes of secondary school./

Der Biologieunterricht, 16, 1980, No.1, pp.41-76.
1 fig., 3 worksheets.

A study of the structure and functions of biomembranes is a subject to which a great deal of attention is devoted by contemporary biologists, chemists and physicists throughout the world. Without an understanding of the structure and function of biomembranes it is not possible to correctly understand the structure and function of the cell. The author therefore here considers the possibility of including a teaching lesson on this subject in the biology course in the upper grades of secondary school. He himself has verified such a teaching lesson and here he shows how this interdisciplinary topic can be taught, while making maximum use of knowledge gained in physics and chemistry teaching. Within the framework of biology itself, this topic can be combined with problems concerning ecology, evolution and ethology /the physiology of transmission of nerve excitation/. The successful teaching of this topic assumes skills in practical work with a microscope, experimenting, knowledge of experimental apparatus, methods of acquiring data of a biological nature /formulation of hypothesis, experiment, interpretation, solution of problem/, modelling theory, knowledge of electron microscopy, the ability to interpret photographs from an electron microscope, extensive knowledge of the cell, its structure and function, the bio-chemistry of substances in the cell and an understanding of osmosis. The author also defines the objective of this teaching, its course, suitable experiments and observations and indicates how the worksheets provided should be used. Also a bibliography is provided with precise information on where drawings, photographs, films and slides on this subject can be obtained.

12.24

771. [illegible]CHMIDT, H.: Thema "Stoffwechsel" im Biologieunterricht des Orientierungsstufe. Einfache Experimente: zählen, messen, auswerten. /The topic "Basal metabolism" in biology teaching in secondary school. Simple experiments: calculation, measurements, assessments./

Naturwissenschaften im Unterricht-Biologie, 28, 1980,
No.10, pp.354-361.
4 figs.

Secondary school pupils in the lower classes are capable of learning about the intake of food, the burning of nutrients in cells to obtain energy, hence the problem of respiration, blood circulation, body temperature and body cover. The author describes simple experiments, which can be carried out with pupils and shows how to process experimental findings numerically, how to measure various data and how to render graphic representations and mathematical conclusions from the experimental data. The article provides interesting methods for acquainting pupils with mathematical methods of assessing findings, observations and experiments in biology. The experiments concern the composition of milk, the composition of the air and the burning of organic substances, calculating the frequency of respiration and heartbeats, measuring body temperature and studying the importance of a hairy coverning on mammals.

12.24

772. TIKHOMIROVA, I.S.: Izucheniye selektsii zhivotnikh na materiale shkolnoy krolikofermy. /The study of the selection of animals on the material at a school rabbit farm./

Biologiya v shkole, 54, 1980, No.1, pp.35-38.

In the general biology course taught in the 10th class, the topic "Selection of plants, animals and microorganisms" requires the use of suitable material for demonstrations. The author recommends the use of rabbits where cross-breeding and selection between individual rabbits with high fertility, good quality fur and large weight can be organized. The school where the author teaches has been undertaking such activities for 12 years. Also specific examples are given of extra-curricula activities by pupils in this area. Results depend upon the actual conditions existing at the rabbit farm and school.

12.24

773. Van WINKLW, L.J.: Evolutionary relationships based on cellular structure.

The American Biology Teacher, 41, 1979, No.1, pp. 50-52.
1 fig.

In many schools cellular structures, the classification of organisms and evolution are taught separately. The author acquaints the reader with an experiment, which aims at helping students to combine the basic concepts of all three areas. The experimental work described combines chemistry, physics and biology, but it can be modified. The students are given 8 cells, which they must first identify on the basis of simple laboratory experiments. Similarities and difference of cellular structure in the cells are classified and entered into a "phylogeny tree". Three such trees can be given to pupils, whose outline is provided in the article. Besides this pupils also have available as aids surveys of the main characteristics of the 4 phylums of living organisms;unicellular organisms without a nucleus and with a nucleus, plants and animals.

12.24
774. WALICKA, T.: Cytofizjologia odpowiedzi immunologicznej.
/The cyto-physiology of an immunological response./
Biologia w szkole, 33, 1980, No.5, pp.299-300.

The author shows how the topic "the cyto-physiological aspects of an immunological response" in the 4th class of secondary school can be taught. This is a topic which requires the use of interdisciplinary relations and an integration of knowledge gained in physics, chemistry and biology. The educational objective of the topic is to acquaint pupils with the foundations of immunology, to extend their knowledge of proteins, serology, the defensive ability of the organism and some aspects of cancer tumors. The basic approach suggested is problem teaching and the course of a lesson is described in detail. Such problems as how antigenes influence the human organism, how the immunological responses of the organism are known /positive as well as negative responses/ and their manifestations /auto-immuno-aggression, reumatism, etc./are discussed. A defensive and destructive immunological response usually occurs at one and the same time.

12.24

775. ZEBALSKA, E. - KUŹNIAR, A.: Metodyczne opracowanie z działu w kl. IV: Środowisko wodne. /Methodological development of the topic "An aquatic environment" in the 4th class./

Biologia w szkole, 33, 1980, No.3, pp.167-171.

The author deals with the topic "An aquatic environment" taught in the 4th class of secondary school. It forms part of a broader topic called "The environment", whose first part deals with terrestial environments and the second with an aquatic one. The methods used are based on problem teaching and the maximum activation of pupils. An excursion is recommended, which makes it possible to become acquainted with various organisms in their natural environment. Class work requires the use of various teaching media such as original objects, slides, films, transparencies, etc. The author recommends an excursion to a lake or pond /2 hours/ and then class-work, where during the first lesson the adaptation of an organism to life in the water is taught and during the second the relation between organisms in an aquatic environment are discussed.

13
776. FRASER, B.J.: Development of a test of science-related attitudes.

Science Education, 62, 1979,No.4, pp.509-515.
2 tabs.

The article describes 5 scales of assessment of attitudes for use by natural science teachers and provides data concerning assessments based on a study of a sample of 1000 students from lower classes. This survey continues in the work of a previous project which was published in this journal. The differences and improvements, in comparison to the previous project, are cited in detail. The science-related attitude test is also describe in detail, its development and application to students from the 7th to 10th classes. In conclusion the author describes various uses to which the test findings can be put.

13
777. SWINDELL, R.F. - RICHMOND, J.M.: Catering for the needs of academically giften students in rural areas /project MASRA/.

The Australian Science Teachers Journal, 24, 1978, No. 2, pp.79-81.
1 tab.

In this article the authors describe the preparation, implementation and assessment of a project whose aim was to provide motivation to academically gifted students living in rural areas. One of the factors which is a barrier to higher education is often the long distance of the student's home from the nearest center providing higher education. The authors sum up other influences which are connected with a rural environment /for instance insufficient specialization of teachers, the fact that rural teachers are often inexperienced, insufficient information sources, personal financial difficulties or insufficient support from family/. In 1975 the MASRA project was carried out in small schools in Queensland to improve the motivation of non-urban students. The findings from a questionnaire indicate that the program increased the interest demonstrated by students for further study /in 23 out of 33 respondents/.

13.1

778. AGUTTER, P.S.: Precision testing: a method for improving students' written work in biochemistry.

Journal of Biological Education, 13, 1979, No.1, pp. 25-31.

4 figs., 1 tab., 2 appendixes.

The article describes a rapid and simple testing method to improve the ability of students to use specialized terms and expressions. The examples of tests provided concern biochemistry, but the same method can be applied to other fields of biology. A sample of 25 students from the 2nd year course were selected from two colleges and a control group was formed by 43 other students with the same specializations. 3 types of precision tests were used. The first two were formed by a group of 20 faulty formulations selected either from textbooks, specialized texts or from work done previously by the students themselves. The third type of test was in the form of a continuous text, which the students had written before taking the first two tests. Here the task was to correct the text written by a collegue. The findings have been statistically assessed.

13
779. AHL, A.S. - HISCOE, H.B.: Using community resources to teach about science and society.

The American Biology Teacher, 41, 1979, No.4, pp. 242-243.

The article describes the use of community resources in the area of information made available through libraries for students for the writing of various projects. By community resources the authors mean both organisations and private persons. They have developed a course which contains specialized information on human reproduction and various techniques which are available for the modification and analysis of the reproduction process from an ethical point of view. The aim of the whole project was to show students the relation between the natural sciences and social problems on the basis of the existing situation where the students received assignments to write essays. Examples of important topics, as well as their information sources are cited, which can be given to students as assignments. The project had a favourable response among students.

13.1

780. CICHY, D. - SZYLARSKA, E.: Normy wymagań dła kl. IV.
/Standards of requirements in the 4th class./
Biologia w szkole, 13, 1980, No.4, pp.203-207.

The new syllabi and curriculums place new requirements on pupils. The main requirement of the new syllabi and curriculums is the objective assessment of a pupil's work. A list of activities done by pupils during class work also serves the teacher as a methodological aid for formulating oral and written assignments for pupils and for the preparation of tests. Also pupils should be acquainted with requirement standards. They follow from an analysis of the curriculum and syllabi on the basis of the educational and teaching objectives connected with the subject-matter to be taught. A total of 46 groups of assignments for pupils are cited.

13.1

781. COLLINSK, M.: Helping students to do better on tests.
The American Biology Teacher, 41, 1979, No.4, pp.239-240.
1 fig.

At a meeting of the National Association of Biology Teachers in 1977 Shellberg described a new type of excercise in which the students themselves assess their work and find errors in tests. For this purpose a key had been prepared. On the basis of this idea the authors of the article have drawn up a similar key for the needs of their students. The key has three section: instructions for use, main

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questions and generalized answers. The main parts of the introductory section of the key are quoted in the article. The final explanations of errors in the tests are summed up in 12 points which each contains also the correct answer. On the basis of the published materials teachers can make up their own alternative of the key.

13.1
782. HENRY, J.A. - HANNA, P.J.: An analysis of a group test for distinguishing formed from concrete thinkers.

The Australian Science Teachers Journal, 24, 1978, No. 2, pp.85-91.
2 tabs.

According to Piaget, during adolescence a transition occurs from concrete thinking to formed or abstract thinking. This is also the period basic education is completed. The development of the school curriculum should take this transition into account. Piaget's method of determining the mental development of a child on the basis of clinical interviews has a number of disadvantages from the point of view of the teacher. For this reason various types of group tests have been designed, the majority of which are in writing, which serve the same purpose. In the article the authors analyse Tisher's and Dale's state of natural science perception test which is composed of 4 groups of questions concerning various areas of physics. They are interested above all in determining the mental operations used in solving various groups of problems. The authors then acquaint the reader with a method of analysis of group tests, which determines the basic theoretical construction which is to be measured.

13.1
783. HENRY, L.L. - ROWS_EY, R.E.: Comparative study of the knowledge of metric units of measure and their applications.

Science Education, 62, 1978, pp. 283-289.
3 tabs., 2 appendixes.

The article provides information on a project aimed at verifying the effectiveness of teaching and the actual introduction of new measure units in the SI system, which have been introduced in the US in 1975. The project concerned three groups of different ages. Among the questions examined were the mutual relation between various SI units and their practical use. 20 different questions were drawn up for determining this knowledge,20 slides were use to determine the use of various units, accompanied by a taped comment. A t-test was used to determine the level of significance as 0.05. Three groups of questions were studied: whether there exists a knowledge of mutual relations between various SI measure units, their practical application and whether there are difference in this knowledge among various age categories. The findings are summed up in tables.

13.1
784. NOVICK, S. NUSSBAUM, J.: Junior high school pupils' understnading of the particular nature of matter:An interview study.

Science Education, 62, 1978,No.3, pp.273-281.
3 figs., 5 tabs.

Almost all Israeli schoolchildren begin studying the physical sciences with a program called "The structure of matter". The authors of the article acquaint the reader with a study project to determine to what extent they understand the particular nature of matter. A written test was found to be unsuitable for this purpose and therefore a Piaget type interview was selected as the main methodology of the project. The interview lasted 30 minutes and 5 aspects of the model of matter were tested for understanding such as for instance that gas is formed by invisible particles, that molecules of gas are evenly distributed in any enclosed area, that between gas molecules there is "empty" space, etc. The sample studied was formed of children between 13 and 14 years of age, selected from 9 urban schools. Each group was formed by pupils with various levels of knowledge and interests. Each pupil was given 3 assignments and 8 questions. The answers were summed up into tables according to their type. The appendixes to the article contain the subject-matter of the assignments and questions. The discussion sums up the conclusions which follow from the study; suggestions for further studies are made.

13.1

785. RUBBA, P.A. - ANDERSEN, H.O.: Development of an instrument to assess secondary school students' understanding of the nature of scientific knowledge.

Science Education, 62, 1978, No.4, pp.449-458.
4 tabs., 2 appendixes.

In the introduction the article provides various definitions concerning an understanding of scientific knowledge. The final one is by Sholwater and contains

7 different criteria. The first is the requirement of understanding the nature of scientific knowledge. To determine the extent of this understanding among secondary school students various instruments have been developed. The article discusses their development and practical use. The first step concerns the development of a natural science model, the classification of its components, their form and content, etc. The findings are summed up in tables. The appendixes contain the criteria for a model of natural science knowlĕdge and the main requirements on the basis of which the student's apptitudes are determined.

13.1

786. SOLOVYEVA, P.P.: *Priemi proverki znaniy uchashchikhsya po teme "Tsvetkoviye rasteniya i ikh klassifikatsiya".* /Methods of examining pupils' knowledge concerning the topic "Blooming plants and their classification"./ Biologiya v shkole, 54, 1980, No.4, pp.30-34.
4 tabs.

The organization of efficient examinations of pupils' knowledge and skills requires the precise determination of which terms, laws of development, facts, etc. the pupils should learn. This should be clear when tasks are formulated. For instance pupils can learn to precisely describe a plant /root system, stem, leaves, blades, distribution of leaves, inflorescence, floral formula, fruit, family, genus, specie/ or to make a comparison of two or more specie of plants /for instance Garden peas and a representative of the Asteraе/ to achieve the permanent learning of

6

basic characteristics of various families of plants. For this purpose programmed cards can be used which the teacher can then correct with a stencil.

13.1

787. STEVENS, J.T. - ATWOOD, R.K.: Interest scores as predictors of science process performance for junior high students.

Science Education, 62, 1978, No.3, pp.303-308.
3 tabs.

The aim of the study which the article reports on was to determine the relation between students' interest in science subjects and their actual performance in these subjects. A Science Process Test developed by Tannenbaum was used. The processes included are observations, comparisons, classifications, quantification, measurement, carrying out experiments and predictions. The interest of pupils in the sciences was tested with the aid of an Inventory of Science Interests, developed by Stevens, which includes several basic groups of problems such as Science and I. How science is done, My biology teacher, etc. The findings were recorded on punch cards and processed by computer. For the testing of hypotheses, regression analysis and a t-test were used.

13.2

788. BOUD, D.J. - DYNAN, M.B. - PARER, L.H. - RYAN, A.S.: Application of the illuminative mode of evaluation: A discussion of issues arising from the physical science evaluation project.

The Australian Science Teachers Journal, 25, 1979, No.2, pp. 67-74.

The authors in this article describe a new approach to assessing curriculum innovation. They discuss various methods used in assessing the Physical Science Evaluation Project used in Western Australia and the findings which it yielded. This concerns the so-called illuminative mode of evaluation whose authors are Parlett and Hamilton. On the basis of this model a new subject has been introduced called the physical sciences, which combines physics and chemistry. The principle of illuminative mode evaluation uses description and interpretation in place of the usual measurements and predications. The method of study includes observations, interviews, the gathering of data on the basis of questionnairs and tests. The article sums up the aims of the evaluation and the best way to procede. The evaluation procedure is divided into three stages: the determination of aims, their explanation and a description of procedure. Each stage has several partial steps. In conclusion the authors discuss various aspects which they consider to be of interest /for instance the suitability of the illuminative mode of evaluation in certain conditions, the composition of the team which carries out the evaluation, etc./.

13.2
789. DEKKERS, J.: Science concept inventories as an evaluation technique.

The Australian Science Teachers Journal, 24, 1978, No. 1, pp.94-97.
3 figs.

The article deals with problems concerning the knowledge of students before a new topic is taught and an evaluation of the knowledge gained. It is especially important for the teacher to determine the prerequisites which students have to understand the new subject-matter. The Science Concept Intentory provides such an opportunity and is described in detail in the article. It is formed by a list of concepts; the students are asked to denote the extent to which they understand the concept. There are 5 possibilities: The problem is understood to the extent of the respondent being able to explain it: it is well understood; partially understood; the respondent is not sure; it is not understood at all. This scale is applied to each topic by all students and the outcome is evaluated and graphically represented for the class as a whole. This basic outline can be adjusted according to need, for instance by adding further questions which concern methods of study /laboratory work, discussions, literary sources, etc./. Added to the article is a list of 88 evaluated terms and concepts for biology and chemistry.

13.2
790. FRASER, B.J.: Difference between boys and girls in six science-related attitudes.

The Australian Science Teachers Journal, 24, 1978, No.1, pp.71-74.1 tab.

The author acquaints the reader with a study which was aimed as determining whether different attitudes exist among boys and girls towards 6 specific problems related to the natural sciences. The project was carried out among students in the 7th class. The problems evaluated were chosen on the basis of work done by Klopfer, who distinguishes 6 categories of attitudes towards the natural sciences. These include opinions concerning scientists and science, the use of questionnairs, the acquisition of scientific attitudes, impressions gained in the course of experiments, an interest in the natural sciences and an intention to make natural science a career. On the basis of statistical assessments it was found that boys significantly surpass girls in 3 categories, while girls have a higher score in 1 category and in 2 categories no significant difference was found to exist between both sexes.

13.2

791. HILL, D.M.: Imagery and Science - a starting point.
The Australian Science Teachers Journal, 25, 1979, No.1, pp.102-104.

The author acquaints readers with a questionnaire which was used to determine to what extent individuals make use of their imagination in solving some problems, what type of problems these are and what is the quality of the respondent's visual imagination. The whole questionnaire is quoted in the article, as well as methods of calculating scores. The findings can be used for prediction, diagnosis and discussion. For instance a student with a low score will probably have difficulties with understanding three-dimensional relations, if a concrete model is not provided, etc. This study continues in works done previously, for instance by Shepard /1978/, White /1977 and Webb /1974/. The questionnaire has a total of 14 questions concerning opinions on abilities to read graphs and maps, how a previously read text is recalled, the need for using three-dimensional models, methods used in dealing with a specific problem on a general plane, etc.

13.2

792. RAVEN, R.J. - MURRAY, R.B.: Effect of high school chemistry experiences on Piaget's operative comprehension.

Science Education, 62, 1978, No.4, pp.467-470.
3 tabs.

The article acquaints the reader with the course and findings of a study project concerning college students. During the project, Piaget's operative comprehension was used to determine differences between students who had undergone courses in college chemistry and those who had not. Piaget defines operative comprehension as the ability to reorganize or to form concepts on the basis of information units. Piaget determined 7 logical structures to analyse the complexity of concept content: classification, sequencing, logical multiplication, achieving parity, proportionality, probability and correlation.
Two types of tests were used in the project, whose content and structure are described in the article. On the basis of the findings it seems evident that those

students who had participated in the chemistry course achieved higher scores of evaluation in comparison with those who did not take the course.

13.3
793. FALKENHAUSEM, E.: Zu den EPA Biologie. /Concerning the school leaving examination in biology./

Praxis der Naturwissenschaften, 29, 1980, No.3, pp. 86-94.

In 1975 the requirements for school leaving examinations /EPA/ in biology were published and since then they have permanently influenced the final year of biology teaching in secondary schools in the Federal Republic of Germany. The author analyses the requirements formulated in 1975; some of them he assesses in a positive manner, but others very critically. He shows how these requirements, as well as possible new ones, can reflect the negative aspects introduced recently into teaching biology. The new requirements are expected to lead to uniformity and the need to compare requirements placed upon pupils during the school leaving examination, which should be of the same quality in all schools. The author, who is a biology supervisor, analyses the topics given as school leaving examination assignments and makes comparisons between them. The requirements often do not contain an explanation of why a topic has been chosen, and this can lead to misconceptions. On the basis of her analysis the author attempts to define the requirements concerning biology. She also assesses the subject-matter and quality of the written part of the school leaving examination.

13.3
794. KOPPRASCH, G.: Zur Veroberaitung der Reifeprüfung. /Concerning preparations for school leaving examinations./

Biologie in der Schule, 29, 1980, No.6, pp.256.

Part of the preparations for the school leaving examination require giving pupils instructions concerning the preparations for the written part of the examination and aquainting pupils with the requirements concerning their external /formal/ form. At the school where the author teaches, the pupils of the 12th classes recieve mimeographed instructions whose content is analysed in detail.

13.3
795. WŁOCH, T.: Ocena wartości dydaktycznej prac maturalnych. /An evaluation of the didactical significance of school leaving examinations./

Biologia w szkole, 33, 1980, No.5, pp.307-309.

One of the educational and teaching objectives of Polish 10year schools is to acquaint pupils with the foundations of scientific work and with scientific methods of studying biological phenomena. The author discusses the implementation of these objectives in schools. The topic he has chosen is a study of the size and structure of erythrocytes in amphibians. This assignment makes it possible to extend the knowledge and skills of pupils, to demonstrate to them the methods used by science and to improve the efficiency of the work done both by pupils and teachers. It is assumed that pupils have some knowledge of systematics, of protected specie of amphibians, their biology, morphology and anatomy, the nature of their tissues and especially that they know something about their blood /blood cells and their nuclei/; in this way pupils learn about the techniques used in scientific work. Among the skills pupils acquire are those used in hematology, as well as the selective use of literature, improvements in microscopy techniques, the determination of animals on the basis of atlases and keys, they improve their techniques in field work, develop their observation abilities, selfcriticism and independent work. In the period 1977-1979 a total of 126 pupils participated in the work on the given subject and 15 of them prepared school leaving examination assignments on this topic. The topic also makes great demands on the teacher who must prepare all technical media, must have a good knowledge of the relevant theory and be committed to leading his pupils towards independent and creative thinking and work on the chosen subject.

13.4

796. HROUDA, A.: Soutěž pro mládež "Poznej a chraň pražskou přírodu". /A competition for youth called "learn about and conserve nature in Prague"./

Přírodní vědy ve škole, 31, 1979/80, No.7, p.254.

Pupils and apprentices become acquainted with the past, present and future trends of development of the natural components of the geographical area of the capital city of Prague in the form of a competition. In 1979/80 the 5th annual competition took place. The competition concerns historical monuments and is aimed at basic school pupils, as well as pupils in secondary schools and apprentices, who receive more difficult assignments.

The aim of the competition is to write essays on all the topics published in a special folder for this purpose, which is distributed by the Prague Centre for Historical Monuments and Nature Conservation in October or November of each year.

13.5

797. MIRONENKO, M.N.: Analiz znanij po biologii abiturientov MOPI. /An analysis of the knowledge in biology achieved by secondary school graduates who are applying for study at the Moscow Regional Pedagogical Institute./

Biologiya v shkole, 54, 1980, No.1, pp.44-45.

On the basis of an analysis of entrance examinations taken by 128 candidates for acceptance, the author recommends that secondary schools devote greater attention to the following:

1. the forming and development of knowledge concerning biological laws of development,
2. greater stress on the relation between biology teaching and the work done by pupils on the school plot of land,
3. more independent work and observations by pupils,
4. extra-curricula study of popular biological literature,

5. developing pupils' interest in biology, especially through the work of hobby clubs and elective courses,
6. developing the creative /research/ activities of pupils, also during seasonal nature excursions.

14

797. MAURER, J.W.: The "conventinal" biology teacher.

The American Biology Teacher, 41, 1979, No.7, pp.434-435.

At present the so-called biological revolution is under way. Hence the role of biology teachers in everyday teaching comes to the forefront. In the author's opinion there are two main problems to deal with: how can biology teachers keep pace with new findings and materials and how to decide what is important. The first problem is accentuated by the fact that students today, due to the mass media, films and books are informed about most recent developments often sooner and in greater detail than the teacher. One of the best methods of overcoming this difficulty, in the author's opinion, is to participate in various national conferences organized by the National Association of Biology Teachers. He cites a survey of the various services which this Association offers during such conferences. In conclusion the author makes suggestions for lowering the costs of participation in these conferences.

14
798. MOORE, K.D.: An assessment of secondary school science teacher needs.

Science Education, 62, 1978, No.3, pp.339-348.
1 tab.

The article acquaints the reader with a study aimed at secondary school science teacher needs, especially those areas where teachers require help, such as determining the relations between various teaching subjects and the needs of the teacher and relations between experiences and needs. Some definitions of terms used in the project are provided. Moore´s assessment profile has been used; the sample studied included 300 teachers from 21 schools. The findings are cited in detail and a discussion offered. A factor analysis of 26 factors was carried out. It was found that the needs of teachers are most pressing in 6 factors - the development of basic natural science skills, motivating students to learn, obtaining and using specialized materials, guiding students towards defining realistic objectives, excercises in teaching methodology and gaining adequate scientific experiences.

14
799. SDOBNINA, L.I. - MOKIN, I.Y.: Orientatsiya uchash-chikhsya na professiyu uchitelya. /The vocational guidance of pupils towards the teaching profession./

Biologiya v shkole, 54, 1980, No.4, pp.15-16.

Experience has shown that the best results are achieved by those biology teachers in rural schools who themselves have graduated from rural schools and later gone on to study teaching. For this reason the authors suggest /and have tested/ making adjustments in the curriculum of the final two years of general education schools in such a manner that pupils, especially from rural schools, are more orientated towards chosing a career in teaching. Once a month those who express an interest in teaching are invited to attend a School of Young Educators, where under the supervision of teachers from the Pedagogical Institute they are able to extend the knowledge needed for a future teacher and acquire skills in independent work, the use of literary sources and especially they are able to verify the permanency and depth of their interest in teaching. This school contributes also to the work of the Pedagogical Institute, since it improves the efficiency of the forms and methods it uses in vocational guidance.

14.1

800. THOMAS, K.W. - VLIJM, L.: Les biologistes dans la société européene. /Biologists in European society./

Biologie, Géologie, 67, 1980, No.1, pp.2-29.

This lengthly article discusses the role of biologists in society. It begins with a history of biology and enumerates the professional activities of biologists in basic research, in applied research, in teaching and in other professional work. Attention is devoted to the professional education of biologists and the future role of biologists in society.

14.2

801. BOUD, D.J. - LAETER, J.R.: Continuing development in science education: A course for professional development of experienced science teachers.

The Australian Science Teachers Journal, 24, 1978, No.3, pp.69-72.
1 fig.

The authors discuss problems connected with the education of science teachers for the upper classes of basic school. The first step in the direction of improving instruction in the natural sciences was a project undertaken by the Australian government called "Program for the development of science education". A study undertaken by Ainley has indicated that a through training of teachers and providing opportunities for students to study are just as important as the facilities available in school laboratories and stock rooms. The West Australian Institute of Technology also trains teachers both in the natural sciences and in education theory. The students are able to decide for themselves which courses to chose. The author describes the curriculum and the structure of the courses offered.

14.2

802. BYBEE, R.W.: Science education for an ecological society.

The American Biology Teacher, 41, 1979, No.3, pp.154-163.
6 figs.

In his earlier studies the author was concerned with changes in science education and the stress placed on social factors which are relevent in a science context.

In this article he concentrates on the attitudes of students and the social changes which have occured; both these factors are the sources of the requirement for new approaches to science education. The article is divided in 5 sections. The first deals with the relations between social problems, the natural sciences and the attitudes of students. The findings of various projects are summed up into points concerning both the present and the future. Special attention is devoted to social evolution, the relation between the natural sciences and technological processes and the question as such. In the next section the author comments the type of natural science education adequate to changing social objectives and values. The third section formulates objectives of natural science education in view of the basic needs of man and in view of the physical environment, natural resources and society. The author then comments the way in which curriculums and tests in the natural sciences are drawn up. The final section of the article is devoted to changes in science programmes and courses.

14.2

803. DAWES, K. - TICHHURST, G.W.: Perception of their pre-service course by science teachers in their first year. The Australian Science Teachers Journal, 24,1978, No.1., pp.74-79.

In 1971 the Kuring-gai College openned a three-year pre-service course for science teachers. The authors of the article sum up the findings of a project which aimed at determining the effectiveness of the course and how it is percieved by its graduates during their first year as teachers. The project was based on questionnaire which the teachers were asked to fill in during a 3-4 hour visit to the college. Besides written questionnaire the teachers also participated in a free discussion, where experiences were exchanged. The questionnaire included a total of 8 questions, the answers were assessed by points. In view of the relatively small number of respondents the findings were not statistically assessed. The authors, however, provide an analysis of the findings and a discussion of the causes and consequences of some of the responses.

14.2

804 YAGODIN, V.N. : Usileniye metodologicheskoy podgotovki uchitelya - vazhneyshaya zadacha. /Improving the methodological education of teachers - a most important task./ Biologiya v shkole, 54, 1980, No.6, pp.3-6.

The significance of ideological and theoretical training of teachers for the tasks of the scientific and technològical revolution in the period of socialism is stressed; from this follow the requirements connected with improving the methodological training recieved by educational personnel. Teachers must teach youth at a qualitatively superior level, how to analyse and evaluate the whole complex of facts and phenomena of the real world. There are several steps which can lead to the improvement of methodological training:

1. increasing the qualification of educational personnel;
2. the organization of methodological seminars on selected problems;

3. the organization of scientific and theoretical conferences concerning methodological problems;
4. the self-education of teachers and making use of basic and specialized literature by the classics of scientific socialism, as well as by contemporary writers.

14.2

805. JUŚKIEWICZ, B.: Przygoda intelektualna nauczyciela na studiach zaocznych. /The intellectual activities of teachers in inservice training./

Biologia w szkole, 33, 1980, No.5, pp.274-275.

Biology teachers are required to keep up with the development of their science, to know about the latest popular, as well as scientific literature in their field, published in books, journals and also to keep abreast advances in pedagogics and special didactics. It is therefore necessary for the teacher to constantly continue in his education. One such form of continued education is inservice training, which is very demanding and usually takes 4 years. It requires iniciative, a good organization of studies, mastering learning techniques and maintaining an overview of the newest literature on the part of the teacher. The curriculum for inservice training has been published in the 4th and 5th issue of this journal in 1974. Every issue of the journal since then has published some article for those who are in inservice training. In the course of study, the teacher must sit for a total of 24 examinations and to write a diploma thesis. During the period of study all examinations should be sitten for on time.

14.2

806. MANTEUFFEL, M.S. - VON BLUM, R.: A model for training biology teaching assisstants.

The American Biology Teacher, 41, 1979, No.8, pp.476-479, 491.
1 fig., 2 tabs.

In spite of the fact that the need for teaching assistants is constantly growing, there is no methodology for their training. The authors describe a model, which has been prepared at the University of California at Berkley, which forms part of the biology surriculum and is based on the most modern forms of instruction. The whole project is supervised by coordinators, who determine consultants, as well as participants in the course. The program has three parts - a preparatory part, discussions and assessment. A total of five discussions are held every two weeks; a coordinator and 5-7 teaching assisstants participate. The aim of the discussion is to help the teaching assisstants in an informal manner with the difficulties they encounter in the course of teaching, to provide them with a communication forum and with the opportunity to discuss the best methods of teaching. The final part of the program, devoted to assessments, takes place in three stages; each student assesses his own work, that of his collegues and then the coordinator assesses the students. The effectiveness of the whole project was tested after its completion on the basis of 10 criteria /knowledge of subject-matter, of laboratory materials, of laboratory techniques, preparation and course of discussions, ability to communicate, etc./ .

14.2

807. WILLINGS, R. - HERMANN, G.: Objectives of science teacher education-importance and attainment.

The Australian Science Teachers Journal, 25, 1979, No.1, pp.73-79.
1 fig., 3 tabs.

In spite of the fact that the education of teachers is very important, there are very few systematic studies of the curriculums devoted to this purpose. In this article the authors provide information on a program for educating science teachers where the curriculum is composed of three basic components - the methodology of the natural sciences, work for a bachelor degree in science and further academic courses. The authors here concentrate only on the first of the above mentioned. The study project reported on was carried out in two stages and investigated the relation between the importance and attainment of objectives, as determined by the authors of the project, lecturers, students and other specialists. Questionnairs were used which contained a total of 23 objectives. In the first part, the respondents expressed their opinion concerning the importance of the objective and in the second their own attainment. The answers were evaluated on a scale of 1 to 5. The findings were statistically assessed by a t-test and summed up in tables.

14.5
808. CLARK, D.J. - McLEAN, J.: Teacher training for teaching assistance.

The American Biology Teacher, 41, 1979, No.3, pp. 140-144, 187.
1 tab.

In the article, the authors attempt to determine those elements which are common for existing curriculums for the training of teaching assistants. They describe a new model based on those elements which they have established as important and examine various methods of its implementation; they cite their own experiences in this area. Among the characteristics of the successful training of teaching assistants are the following: courses in education theory, practical teaching sessions, the use of audio-visual aids, methods used in repetition and micro-teaching. One of the most important subjects taught is an introduction to various instruction methods, such as lectures, answering questions, guided discussions, demonstrations, the motivation of students and designing tests, courses and individual lessons. The described model was designed at Washington University.

14.5
809. WOODWARD, E.: Self-instruction as an aid to in-service training and education and its implication in the medical laboratory.

Journal of Biological Education, 13, 1979, No.3, pp. 221-227.
2 figs.

The author comments on various aspects of training, including conventional techniques and the use of self-instruction. He discusses materials for self-instruction, with special stress on their design, so that they can be used with various methods of work. In this context the author describes such specific materials designed for use in medical laboratories. These materials, requiring only limited literacy and a knowledge of some arithmetic , have been tested in Gambia.

14.6

810. HORN, F.: *Pädagogische Lesungen 1979. Vorschlage zur effektiveren Gestaltung des Unterrichts.* /Pedagogical readings 1979. Suggestions for more effective teaching./ Biologie in der Schule, 29, 1980, No.1, pp.4-11.

The author describes briefly those pedagogical readings which were evaluated as best; 4 of the readings concerned the transmission and learning of knowledge and skills, 1 reading concerned the reinforcement and application of acquired knowledge and 3 concerned the educational objectives of instruction. Three readings concentrated on the use of teaching media. In conclusion various recommendations for the preparation of pedagogical readings in the next year are made.

14.6

811. HORN, F.: Pädagogische Lesungen 1980. Zu einigen Erfahrungen aus dem Unterricht im Fach Biologie.
/Pedagogical readings 1980. Concerning some experiences in biology teaching./

Biiologie in der Schule, 29, 1980, No.10, pp.408-417.

In the school year 1979/80, 28 pedagogical readings were evaluated. 10 readings were considered to be excellent and 16 good. Among the excellent ones, one was awarded a first prize, two were awarded second prizes and seven were awarded third prizes. 17 of the readings were read on February 25th to 28th, 1980 at the Institute for the Further Education of Teachers at Ludwigsfelde. Individual readings are described in greater detail in the article and are divided into those which concern the learning of knowledge and acquiring skills, the development of capabilities, interdisciplinary relations, health care education, homework, facilities in a classroom and the use of teaching media. In conclusion a list of awarded authors is provided, as well as recommendations for the subject-matter upon which future pedagogical readings should concentrate.

14.7

812. BAER, H.W. - BARTELS, A.: Grundlagendes Wissen und Fachkoordination im Biologieunterricht. Bericht über die XVII. Schulbiologentage vom 10. bis 13. Mai 1980 in Rostock. /Basic subject-matter and interdisciplinary relations in biology teaching. Report to the XVIIth Congress of School Biology, held on May 10 - 13, 1980 in Rostock./

Biologie in der Schule, 29, 1980, No.12, pp. 526-529.

At the Congress 13 papers were presented at the plenary session and 51 papers were presented in 3 sections. A total of 28 papers were presented by the staff of the Rostock region, where the topic of the Congress is also the subject-matter of research in didactics. A total of 400 specialists, including guests from Bulgaria, Czechoslovakia, Poland, Hungary and Yougoslavia, participated in the Congress. The authors acquaint the reader with the names and content of the papers presented to the plenary session and the names of the three sections. Among the foreign participants, Prof. Stawiński from Poland, Dr.Horník from Czechoslovakia and Dr. Buda from Hungary presented papers to the plenary session.

14.7

813. BAUDÉ J. et al.: Réflexions a propos des journées pédagogiques "Informatique et biologie" du congrés APBG de Toulouse. /Some considerations on the pedagogical sessions of the APBG Congress held in Toulouse, concerning "Pictorial information and biology"./

Biologie-Géologie, 67, 1980, No.1, pp.91-94.

Practical experience with biology teaching with the aid of pictorial information was one of the subjects discussed by biology teachers at the Congress. The article contains constructive criticism which aims at improving the use of pictorial information and its utilization in biology instruction. Suggestions and ideas made by experienced teachers may prove to be valuable for teachers in other countries.

14.7

814. Bericht über das IV. Seminar zur Didaktik des Biologieunterrichts der Volksrepublik Poland, 18-21. Juni 1979 in Przemyśl. /Report on the 4th seminar on the didactics of biology teaching in the Polish People's Republic, held on June 18th to 21st, 1979 in Przemysl./
Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.2, pp.57-58.

The 4th seminar on the didactics of biology teaching in Polish schools was held in the town of Przemyśl from June 18th to 21st, 1979. The main topic was the problem of the theoretical foundations and findings from a research project aimed at the control and evaluation of biology teaching. The seminar was organized jointly by the section on the didactics of biology of the Nicolaus Kopernicus Society of Polish Natural Scientists and the section on school biology of the Biological Society of the G.D.R. A number of guests from the Federal Republic, the G.D.R., France and Czechoslovakia also participated. The meetings were chained by prof. Stawiński, the chief of the Institute of Didactics at the Pedagogical Faculty at Krakow.

14.7

815. BONATZ, H.H.: Biologen als Gesundheitserzieher. /Biologists as educators in health care./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.7, pp.222-223.

The conference on the topic cited in the title was held in Bad Karshafen-Weser on May 15th to 17th 1980. The meeting was convened by the Federal Association for Health Care Education in Bonn, in cooperation with the Association of German Biologists. The meeting dealt with civilizational changes, which are damaging society by causing children's disease and various large-scale infections. It was stressed that teachers should be informed and should have the opportunity to cooperate with health care personnel and physicians. All the knowledge available to modern medicine should be made use of to provide teachers with information and through them also to provide information to pupils. The meeting also assessed the present situation and possibilities for improvements, as far as the transmission of basic health care information through the schools and biology teaching are concerned.

14.7

816. Centre international de formation et de recherche en sexualité. /The Internationa Centre for Research and Education in Semuality - 6th symposium on sexual education./

Biologie-Géologie, 67, 1980, No.1, pp.30-39.

This international centre in Toulouse organized a symposium on sexual education in July 1980. A number of interesting papers were presented. The article also published a questionnaire discussed at the symposium, which with slight adjustments could also be used in other countries. Educators and teachers, beginning with kindergartens, up to colleges and universities, had an opportunity to exchange experiences.

14.7

817. CICHY, D.: Narada exportów nauczania ochrony środowiska w Finnlandii. /A conference of experts in the field of nature conservation in Finland./

Biologia w szkole, 33, 1980, No.3, pp.148-149.
1 tab.

On January 7th to 11th 1980 a conference of specialists in education towards nature conservation and environmental control was held in Finland on the topic "Preparing the subject-matter and methods of teaching nature conservation and environmental control in secondary schools". Experts from the countries which are members of the Council for Mutual Economic Assiastance, including the USSR also participated. The aim of the conference was to prepare a draft for including nature conservation and environmental control into the curriculum of Finnish secondary schools. The participants exchanged experiences and in the various papers presented made various suggestions for the coordination of teaching and education in this area. It was decided to exchange materials used in schools between Finland and the CMEA countries; some of these aids were demonstrated at the conference. The participants also took part in an excursion to a centre for the production of Finnish teaching media for natural and social science teaching subjects. The article also contains information on the organization of the Finnish school system. General education schools have a six year lower level and a three year higher level, i.e. nine years of basic school. This continues with an upper secondary school /three years/ or apprentice secondary school /also three years/. Vocational higher schools have 2 year courses, while all other institutions of higher learning have 7 year courses. Children begin school attendence at 7 years of age and manadatory school attendence is until 19 years of age.

14.7

818. DEMOND- LORENZ: Formation initial et formation continuée. /Basic education and further education./

Biologie-Géologie, 67, 1980,No.2, pp.359-361.

The article is a report on a conference of chairmen of local chapters of the Association of Professors, which discussed the education of lycee and secondary school professors. The conclusions arrived at by the meeting, which are the subject-matter of the article, concern not only their specialized education, but also their pedagogical education, which continues during in-service forms and other forms of gaining further education and which aims at keeping teachers abreast of the latest developments in science.

14.7

819. GŁOWACKA, J.: Z badań nad rola "Biologii w szkole". /On studies concerning the role of "Biologia w szkole"./

Biologie w szkole, 33, 1980, No.1, pp.33-37.
4 tabs.

The article sums up the findings from a questionnaire project, which the students of the 4th year course at the Pedagogical Faculty at Kielce, who specialize in biology, undertook with biology teachers in the Radom region. A total of 178 persons participated in the study. The main findings are summed up by the following: the section of the journal which contains practical teaching experience should be extended; the number of articles dealing with various teaching topics at basic school should also be extended; modern methods of teaching should be supported to a greater extent; the journal should have colour illustrations and should devote more publicity to various competitions. Also mention should be made of new phonograph recordings which could be used in biology teaching.

14.7

820. HASS, G.: Aus der Arbeit der Fachkommision für Biologie im Stadtbezirk Berlin - Prenzlauer Berg. /Concerning the work of a specialized committee in one of the Berlin districts./

Biologie in der Schule, 29, 1980, No.1, pp.31-33.

The author first cites the composition and aims of the specialized committee and examples of its plan of activities. The committee meets every 6-8 weeks. Its plans for September, November, January, March and June are described.

14.7

821. HOMOLA, J.: O přenosu nových biologických poznatků do didaktického systému. /Concerning the transmission of new biological knowledge into the didactical system./

Přírodní vědy ve škole, 31, 1979/80, No.9, pp.331-332.
1 outline.

The journal Biologické listy, in cooperation with the biology and geology section of the journal Přírodní vědy ve škole, published a questionnaire concerning the relation between the development of biology as a science and the transition of this new knowledge into the didactical system used by our schools. 15 foremost experts from various colleges and universities providing degrees in the natural sciences, medicine and education, as well as some secondary school teachers, were given the following questions: Which selection criteria for including new knowledge into the didactical system do you consider to be crucial; How should such criteria and methods of differentiation be organised for general education secondary schools, specialized natural science schools and specialized technical schools; Which methods should be used for implementing this transition of selected knowledge into the didactical system; Your opinions on the ideal time gap between a scientific discovery, its verification and inclusion into a didactical system.

14.7

822. HORNÍK, F.: XVI. mezinárodní konference o problematice výuky biologie. /The XVIth international conference on problems of biology teaching./

Přírodní vědy ve škole, 31, 1979/80, No.6, p.212.

On May 14th to 17th 1979 a conference was held in Magdeburg in the G.D.R. on the topic "Literary media and their use in biology teaching". The deliberations took place in a plenary session and in various sections concerned with three groups of problems: 1. the creation of literary media for biology teaching; 2. the use of literary media in manadatory teaching and 3. the use of literary media in extra-curricula activities and elective subjects.

14.7

823. HRUBÝ, I.: Východočeský seminář k problémům životního prostředí. /An East Bohemian regional seminar concerning problems of the environment./

Přírodní vědy ve škole, 31, 1979/80, No.5, p.172.

In August 1979 a regional seminar was held in the town of Rýchory concerning education towards environmental conservation within the framework of the new concept of the Czechoslovak teaching and educational system. The introductory paper, entitled "The concept of education towards environmental conservation in the new project of the Czechoslovak teaching and educational system" was presented by Dr. Kvasničková. In further papers the participants were acquainted with some new teaching aids prepared for this topic. Other papers concentrated on various forms of educational work in schools and specific examples of conservation activities by various hobby clubs, etc.

14.7

824. KOCHMAŃSKI, B.: Konferencja wizytatorów metodyków biologii. /A conference of biology supervisors./ Biologia w szkole, 33, 1980, No.2, p.123.

In November a conference of biology supervisors and experts in the methodology of biology teaching, which was organized by the Warsaw IKN Institue in coordination with the Ministry of Education, was held in Novi Sącz. The agenda included problems and objectives of educational activities in 1979/80, problems of the further improvement of the activities of school supervisors in biology, the coordination of their activities with the work of research institutes, the editors of the journal Biologia w szkole and others. Papers were presented concerning the objectives and tasks of schools in the forthcoming period when the curricula of a number of schools will be changed, new textbooks will be introduced and biology teaching modernized. Also various aspects of problem teaching, the didactics of biology, the use of school radio programs and the organization of special biology classrooms and stock rooms were discussed. The participants in the conference examined and assessed the furnishings and facilities of a biology classroom in the school where the conference was held. They also recieved the draft of a syllabus for teaching hygiene in the 3rd and 4th classes of general education secondary school, in the biology and chemistry specialization and in the 4th to 10th classes of basic school.

14.7

825. Konferencja na temat nauczania ochrony i kształtowania środowizka w 10-letnej powszechnej szkole średnej, Białowieza, 2 - 11. IX. 1980. /A conference on teaching the topic "The conservation and development of the environment" in the 10 year general education secondary school; Białowieza - September 2nd to 11th, 1980./ Biologia w szkole, 13, 1980, No.5, pp.310-312.

A conference was held on education towards environmental conservation and nature conservation in Polish general education secondary schools. The conference was organised by the committee "Man and the Environment" of the Presidium of the Polish Academy of Sciences, in cooperation with the Ministry of Education, the Institute for School Curricula and with the participation and help of UNESCO. The conference was aimed above all at problems of didactics and education towards environmental conservation. Participants included school supervisors and the staff of educatiional centers from all over Poland. The agenda included papers on the new curriculum and its implementation in Polish schools. It was decided to prepare a methodological handbook, to introduce teaching topics on environmental conservation into all types of schools, to educate personnel for this type of education, to re-assess existing curricula and syllabi and to extend the teaching of environmental conservation in them, to make maximum use of interdisciplinary relations, to make this topic the subject of diploma theses at colleges and universities, to increase the printings of books and handbooks concerning this problem, etc. It was also suggested that in the 9th and 10th classes this topic be introduced as a spedial teaching subject.

It should also be represented in Biology Olympiads and other biological competitions.

14.7
826. KRAUSMAAR, R.: Bucher Wissenschaftler rechneten Settbewerbsergenisse ab. /The scientists of Buch assess the outcome of emulation./

Biologie in der Schule, 29, 1980, No.2-3, pp.122-123.

In many enterprises and institutions the outcome of socialist emulation is regularly.assessed. Also the staff o the Central Institute of Molecular Biology in Berlin - Buch have assessed their acitivites. Their emulation concentrated on the development of the health-care service, the pharmaceutical industry and agriculture, within the framework of basic research The author discusses various specific aspects of this activity.

14.7
827. McGRANN, S.M.C.: Voyager I-Jupiter encounter educator's conference.

The American Biology Teacher, 41, 1979, No.5, p.300-320. 1 fig.

The author reports on an educational conference concerning the Voyager I spacecraft which, was held in March 1979 and discussed the encounter between the spacecraft and the planet Jpiter. Participants learnt a number of interesting facts concerning Jupiter, especially those places which manifest intensive activity. Also the work of the spacecraft was described, as well as its main research tasks. Data was sent back to Earth at the rate of 115 000 items per second. Part of the conference was also a symposium called Jupiter and the Human Mind. Through Voyager I man was for the first time able to observe Jupiter's ring at close range.

14.7

828. MATHOFER, W.: Aus der Arbeit der Fachkommision. /On the work of a specialized committee./

Biologie in der Schule, 29, 1980, No.6, pp.259-260.

It has been found that the preparation of pupils for school-leaving examinations requires constant attention, already well before pupils arrive in the 10th /final/ class. Especially the making of explanations, descriptions, definitions, assessments, comparisons, etc. needs to be constantly trained. A specialized committee has therefore prepared aids for pupils to enable them to overcome these difficulties. It also provides instructions for teachers on how to carry on the examination. The content of the teaching aids are analysed; they also include a model outline of a protocol on a scientific subject, as well as various tables, plans, graphs, curves, surveys and drawings which are all described.

14.7
829. MEWES, K.: Lesergespräch in Rostock. /A discussion with readers held in Rostock./

Biologie in der Schule, 29, 1980, No.7/8, pp.347.

In the course of the XVIIth Congress of School Biology held in Rostock in the G.D.R., the journal Biologie in der Schule held a discussion with its readers. The editors were interested in learning which articles the readers are most interested in and which are most useful to them, as well as which problems should be dealt with in more detail in the journal. Especially problems of health education, the further education of teachers and various forms of cooperation with the journal were the subjects of discussion.

14./
830. MISIEWICZ, M.: Z doświadczeń wizytatora - metodyka. /From the experiences of supervisors in methodology./

Biologiya w szkole, 33, 1980, No.3, pp.145-147.

The reform of the Polish teaching and educational system requires certain changes in the curriculum. These changes will lead to far reaching changes in the work of teachers, as well as to changes in the activities of supervisors. The implementation of the new project brings with it a number of problems and difficulties which must be solved. These include above all bringing the syllabus up to date as far as the newest scientific discoveries are concerned and helping teachers deal with these current problems.

But at the same time the activities of supervisors aim at helping teachers to overcome initial problems in implementing the new educational project and showing them how to deal with the new syllabus and curriculum, how to win over pupils to an interest in the teaching subject, how to divide the syllabus into individual teaching lessons, how to change the teaching process into a learning process, how to improve contacts with pupils and improve their activities, how to use new teaching media and how to work with slow learners. Individual consultations of teachers with supervisors are very important in this context.

14.7

831. OLDROYD, D.R.: Values of science - a fundamental problem for science teachers.

The Australian Science Teachers Journal, 26, 1980, No.1, pp.163-168.

The Australian Academy of Sciences in August 1979 organised a symposium in Melbourne on the subject "A study of the history and philosophy of science, their educational role and impact on current problems". The good quality of the symposium was guaranteed by the participation of outstanding scientists from a number of colleges and universitites throughout the world. The article sums up the deliberations of the symposium concerning the given topic, in connection with teaching in various types of schools. A number of suggestions and problems connected with the study and life of students were also the subject of discussions.

14.7
832. PIOTROWICZ, M. - ZABEL, E.: IV. Seminar zur Didaktik des Biologieunterrichts in Przemysl, VR Poland. /IVth seminar on the didactics of biology, held in Przemysl in Poland./

Biologie in der Schule, 29, 1980, No.4, pp.152-156.

This seminar was held on June 18th to 21st 1979 and was organized by the Section on School Biology of the Biological Society of the G.D.R., together with the Section on the Didactics of Biology of the M. Copernicus Society. Among the items on the agenda were problems connected with the verification of the outcome of teaching and reinforcement of what has been taught. 178 people participated in the seminar; of this number 38 were specialists in the didactics of biology from foreign countries /GDR, Czechoslovakia, France, the Federal Republic, Yougoslavia/. The authors describe the agenda in detail and the subjects of the main papers presented.

14.7
833. PODSTOLSKA, M.: Nauczanie ochrony i kształtowania środowiska. Wywiad z predstawicielem UNESCO. /Teaching environmental conservation. An interview with a representative of UNESCO./

Biologie w szkole, 26, 1980, No.5, pp.268-274.

The Białowieza National Park in September of 1980 held a nine day conference which was devoted to the problems of teaching environmental conservation in general education secondary schools. The conference was held with UNESCO participation, which was represented by prof. Kolibine. The author of the article held an interview with him, in which the professor answered questions concerning the objectives of UNESCO in organizing the international programme of environmental conservation, what is the role of science in its implementation and what is the role of teachers in this educational programme. Also such problems as the aims of UNESCO in the training of educational personnel for these purposes, and its plans for further activities were discussed. Prof. Kolibine stressed the importance of the conference for educational work in schools and the importance of the National Park at Białoweza for the implementation of educational objectives in Poland.

14.7
834. RĂUBER, A.: Veranstaltunge der Biologischen Gesellschaft-Sektion Schulbiologie. /Activities of the Section for School Biology of the Biological Society./ Biologie in der Schule, 29, 1980, No.1, pp.36-37.

The author cites the objectives, dates and leaders of various activities organized for teachers which concern the following topics: phylogeny, biology teaching at a Zoo, ecology and nature conservation, health care education, marine biology, selected problems concerning the significance of biology, ecological problems in parks and botanical gardens.

14.7
835. ROSIER, M.J.: The role of National Subject Teachers Associations.

The Australian Science Teachers Journal, 25, 1979, No. 1, pp.55-58.

The author provides a survey of organizations and their activities, which are part of the National Subject Teachers Association. The main purpose of the Association is to improve instruction, especially by improving the professional quality and development of teachers. The development of the Australian school system was influenced by the large population growth which occured after World War II and later by a decrease in immigration. It was during this period that, in the author's opinion, Australian schools encountered a number of problems. The author formulates four various tasks for the National Association for the future: to improve communication among members /by the publication of journals, by organizing conferences/, to provide various services to teachers /for instance the mailing of various materials/, to better coordinate activities at the national level and finally to represent its members at the national level.

14.7
836. Sektion Fachdidaktik im Verband Deutscher Biologen. Bericht über die Tagung der Sektion Fachdidaktik im VDB in Bad Bol 17. - 21. 9. 1979. /The section of specialized didactics of the Society of German Biologists. Report on a meeting held in Bad Boll on 17th to 21st September, 1979./
Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 1, pp.25-26.

On September 17th to 21st, 1979 a meeting of the section on specialized didactics of the Society of German Biologists met in Bad Boll. The main point of the agenda was the topic "The didactics of biology as a science". Among the problems discussed were the contribution made by universities to the training of future teachers, what universitites expect of the school system as far as the education of their future students is concerned, what is the opinion of professional biologists of the didactics of biology, are the didactics of biology more applied biology or more applied didactics, teaching models used in teaching at colleges and universitites, research media in the didactics of biology and empirical studies in the didactics of biology.

14.7

837. SCHELLHORN, M.: Philosophische Sommerschule 1980: Kritik der bürgerlichen Naturphilosophie und der Wissenschaftspolitik im Kapitalismus. /Summer school for philosophy: A critique of bourgeois natural philosophy and science policy under capitalism./ Biologie in der Schule, 29, 1980, No.12, pp.532-534.

A summer school for philosophy was held on June 4th to 6th 1980 which concentrated on world outlook problems and the philosophical problems of mathematics, the natural sciences and the technical sciences. The course was aimed at the further education of teachers at universitites and colleges. The author acquaints the reader with the content of the papers presented in various sections and with a paper called "World outlook and philosophical problems of biology". For

June 1981 the 7th summer school on philosophy is planned, where the main subject will be "Development trends in the natural sciences and the technical sciences and the opportunity of their social implementation".

14.7

838. SPIESS, H.J.: 10. Generalversammlung und wissenschaftliche Vortragstagung der Biologischen Gesellschaft der DDR. /The 10th General Assembly and scientific session of the Biological Society of the G.D.R./

Biologie in der Schule, 29, 1980, No.9, pp.394-396. The General Assembly was held on May 2nd to 4th, 1980 in Weimar. The main topic was "The development of methods and the advances made in biology". 465 domestic scientists and 3 guests from abroad participated. For the first time the Carl Correns Biological Society Medal was awarded to dr. Thomas Börner from Halle for his work in molecular genetics and to prof. M. Hecker /from Greifswald/, for his studies of biochemical processes in the germination of plants. The article sums up briefly the main subject of the various papers presented. A new presidium was elected, and the names of its members are cited.

14.7
839. VLIJM, I.: Association des Biologistes des communautés européennes. /The association of biologists of the European Community./

Biologie-Géologie, 67, 1980, No.1, pp.45-46.

In 1975 the above mentioned association was founded with the aim of representing the interests of biologists of whom there are 50 000 in the Community and to provide consulting services within the Community concerning all biological problems connected with human society. Through this association the public will be better informed on current problems of nature, health care, hygiene, etc., while at the same time schools with recieve aid in the education of people in relation to the changing conditions of the environment.

14.7
840. ZABEL, E.: Vorankündigung XVIII. Schulbiologentage 1981 vom 9. bis 12. Mai in Güstrow. /Preliminary information on the XVIIIth Conference on School Biology, to be held on 9th - 12th May, 1981 in Güstrow./

Biologie in der Schule, 29, 1980, No.9, p.397.

The topic of this conference will be the following: The contribution made by hobby clubs and elective school courses to the development of a socialist personality. The conference should deal in greater depth with the differentiation of biology teaching and to clarify the function, objectives and specific aspects of work in hobby clubs and elective courses.

Besides the papers presented to the plenary session of the conference, others will be presented to the 4 work groups which will meet. An exhibition of various teaching media will be held during the conference, with special regard to hobby clubs and elective courses.

14.7
841. ZABEL, E. - HEINZEL, I.: Ernst-Haeckel Schülerpreis 1980. /The Ernst Haeckel School Prize in 1980./

Biologie in der Schule, 29, 1980, No.12, pp.530-531. 1 fig.

For the 10th time the Biological Society of the G.D.R. has awarded the E. Haeckel Prize for outstanding work in biology done by pupils. A total of three papers were rewarded /two concerned fauna, one biochemistry/, which the author describes briefly. 2 other papers received honorable mention.

14.7
842. ZICHÁČEK, V.: Olomoucká Exota. /The Exota exhibition held in Olomouc./

Přírodní vědy ve škole, 31, 1979/80, No.3, pp.94-95.

The 5th EXOTA exhibition in Olomouc was held on November 23rd to 25th 1978 with the slogan "The beauties of nature into our homes". Among exhibitors were those who breed birds and fishes from Belgium, Bulgaria, Italy, Poland, Hungary, the USSR, Austria and other countries. A total of 3 000 exhibits included 250 species of birds and aquarium fishes.

14.9

843. BELOV, I.G.: K yubileyu V.A. Tetyuryeva. /At the occasion of V.A. Tetyuryev's birthday./

Biologia v shkole, 54, 1980, No.1, p.48.

In the article readers are acquainted with the life and work of V.A. Tutyuryev, the well-known expert in the didactics of biology, who in 1979 celebrated his 80th brithday. He has written a number of didactical works, his book on the methodology of experiments in plant physiology has also been translated and published in Czechoslovakia. He has written 6 textbooks and still continues to publish books for his students, to whom he passes on his rich experiences with nature observations.

14.9

844. KARTSEVA, I.D.: K yubileyu N.A. Rikova. /At the occasion of N.A. Rikov's birthday./

Biologia v shkole, 54, 1980, No.3, p.47.

The article is devoted to the pedagogical and didactical work of professor Nikolay Alexandrovich Rikov, doctor of pedagogical sciences, chief of the department of natural sciences at the Leningrad State Pedagogical Institute, at the occasion of his 70th birthday. Prof. Rikov has written textbooks on zoology and on the methodology of teaching zoology. In a total of over 200 publications he deals not only with the theoretical foundations of didactics and teaching methodology but also with questions of problem teaching, the educational impact of teaching,

teaching methods, the use of experiments in zoology teaching, etc. He is also chief of the faculty for improving the qualification of teachers who teach the methodology of biology at Pedagogical Schools /the only faculty of its kind in the USSR./.

14.9
845. STAWIŃSKI, W.: Włodzimier Woźniczak 1889-1980.
Biologia w szkole, 33, 1980, No.5, pp.312-314.

The author remembers Włodzimier Woźniczak /he was born November 8th 1899 in Przemyślu and died May 16th, 1980/ who was an outstanding teacher. He taught for many years at a general education secondary school and was also active in adult education. Together with S.K. Pieczka he is the author of a basic textbook on genetics, published in 1958. He recieved many awards and medals during his lieftime.

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846. ALTMANN, A.: Archeologie - nový vědní obor. /Archeology - a new filed of science./
Přírodní vědy ve škole, 31, 1979/80,No.4, p.133.

Archeology deals with the past of animal communities on the basis of a study of findings of material activities of man, such as stone, bronze and iron tools, ceramic objects and a study of the remnants of bones and other parts of animal bodies. It studies the evolution of animal species in relation to the cultural development of man.

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847. ALTMANN, A.: Nový způsob využití baktérií. /New methods of utilizing bacteria./

Přírodní vědy ve škole, 31, 1979/80, No.10, p.372.

It has been found that bacteria can help in obtaining some metals from old heaps found near mines or from ores which have only a small amount of some heavy metal, such as copper, zinc or uranium. The process is known as the leaching method. The pulverized ore with a small amount of the metal which is sought is placed in large vessels, covered with a layer of pyrite and left for weeks or months under the continuous action of a cultivating medium with bacteria, usually Thiobacilus thiooxidans and or Ferrobacilus ferrooxidans.

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848. AUXERRÉ-BARDOT-LE DOUSSAL, C.: Les faluns du miocéne en Tourraine et en Blésois. /Miocene sediments in Tourraine and in Blésois./

Biologie-Géologie, 67, 1980, No.1, pp.198-312. 108 figs.

A group of three biology professors set for themselves the task of examining the sedimentation and paleontological findings of miocene sediments in the regions of Tourraine and Blésois. The outcome of their endeavours is this extensive paper, documented with photographs and many drawings of conches, whose remnants mixed with quartz sand form a mixture which is used for industrial purposes. The paper includes descriptions of more than 200 species of conches and their systematics. The second and third continuation of the paper will be published in subsequent issues of the journal.

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849. AUXERRÉ, P.: Les faluns du miocene en Tourraine et en Blésois - clés de determination des genres fossiles. /Miocene sediments in Tourraine and Blésois - keys for the determination of fossile species./

Biologie-Géologie, 67, 1980, No.2, pp.550-606.

This paper is the third part of a study of miocene sediments in Tourraine and Blésois. Here the author deals with fossilized species of animals in these sediments, for which he has devised a systematic key for their determination. The whole project is concentrated into summarized tables which are accompanied by drawings.

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850. BARDOT, S.: Les faluns du miocene en Tourraine et en Blésois - données de paléecologie. /Miocene sediments in Tourraine and Blésois - the gifts of palé ecology./

Biologie-Géologie, 67, 1980, No.2, pp.499-550.
9 figs.

This is the second of a series of three articles concerning a study of miocene sediments from the vicinity of Tourraine and Blésois. It deals especially with fossils found in the sediments and their use in palaeographical and palaeoecological reconstructions. Findings are summed up in tables according to specie, their manner of life and climate which existed at the time.

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851. BEISENHERZ, W.: Der Nakuru-See - ein limnologisches Modell mit fachübergreifenden Aspekten. /Lake Nakuru - a limnological model with interdisciplinary aspects./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.6, pp.351-358.
4 figs.

Lake Nakuru in Kenya typically has few species, but large populations of those species which it does have. It can thus serve as a model for the study of ecological relations in biology teaching. Damage to the ecosystem as a consequence of pollution by a nearby industrial town /Nakuru/ can easily be analysed from the point of view of food chains and the problems of environmental conservation and industrialization. The lake is found in a developing country and solutions should take this into account. For instance this concerns the insufficient development of industry and agriculture, rapid increases in population and the specific relations of developing countries towards developed countries /colonial past, political conflicts at present/. The author deals with how to prepare this topic for class in a general education secondary school.

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852. BRATANOV, K.: Za strategicheskite napravleniya v biologiyata i takhnato prilozheniye v zhivota. /On strategic trends in biology and their use in life./

Biologiya i khimiya, 23, 1980, No.3, pp.1-4.

The Political Bureau of the Bulgarian Communist Party in 1976 and a plenary session of its Central Committee in 1978 dealt with the problem of the development of biology and recommended that the teaching of biology be rid of its statical nature and that its dynamic aspects be stressed, as well as its significance for socialist science and the socialist economy.

In the contemporary approach to biology two aspects are considered to be most important - a knowledge of the composition of proteins as the main component of living substances and the biosynthesis of proteins in view of the requirements of man. Thus a study of the bio-synthesis of proteins and a study of their structure are important strategic objectives.

Another strategic objective is a study of the main processes which occur in living substances in view of the requirements of man.

A third objective concerns the utilization of world biological resources /micro-organisms, plants and animals/. Other objectives concern maintaining biological equilibrium in view of the advancing industrialization of the country. Finally the fifth strategic objective concerns prolonging the creative and working abilities of man.

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853. COLLINS, D.D. - WEAVER, T.: Determining shrub biomass from aerial photographs: An indoor ecology excercise.

The American Biology Teacher, 41, 1979, No,2, pp.
114-115.
1 fig., 1 tab.

The article describes an indoor ecology excercise which was developed at the State University in Montana. In spite of the fact that on a small area a varied plant community was found, it could not be studied because it was inaccessible for most of the school year in view of climatic conditions and distance. The author therefore suggested using aerial photographs of the area in question. On their basis, students could make up maps of vegetaion, measure some parameters /for instance the height of trees on the basis of their shadows/, estimate conditions in the area on the basis of an analysis of the vegetation the presence of water areas, altitude above sea level, geological conditions, etc. The authors describe in detail various assignments given to students in this project.

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854. COTHERN, C.R. - COTHERN, M.P.: Uncertainty - we do need it

The American Biology Teacher, 42,1980, No.1, pp.58-60.
1 fig.

Uncertainty, which is the cause for instance of the late arrival of a trail or airplane, often causes stress situations to those who are waiting. People are often unaware of the fact that uncertainty also accompanies precise scientific measurements. The article discusses uncertainty as a phenomenen which accompanies the every day lives of all people, but also science, where even the most precise measurements can and do contain errors. Examples are cited from nuclear physics, microscopy and other sciences.

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855. CRESHAW, N.: Teaching the history of science through inquiry.

The American Biology Teacher, 41, 1979, No.9, pp.564-565. 2 figs.

It is very important for students to understand how the natural sciences have developed up the present. In the article the author describes the methodology of teaching the history of the natural sciences with the aid of a questionnaire. First he formulates some basic rules to guide the teacher; the whole project can be graphically represented as a circle, where the students continue from one question towards another. The author defines six basic circkes: historical events, why natural scientists use specific methods, the formulation of a hypothesis, etc. As a specific example the author has chosen the problem of the classification of living organisms, beginning with Aristoteles. The students are given an assignment where they classify a number of organisms on the basis of various pictures, specimens, trips to a Zoo and museum, outdoor excursions, films, etc.The findings are then mutually confronted in class.

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856. DIMKOV, R.: *Sintetichnite polimeri - obshche yedin ekologichen problem.*/Synthetic polymers - yet another ecological problem./

Biologiya i khimiya, 23, 1980, No.3, pp.13-15.

Several decades ago synthetic processes were limited only to autotrophic and heterotrophic biosynthesis. Now to this we have added chemical synthesis as a technical activity of man . Micro-organisms, which in nature have a sanitary function, are not capable of disintegrating these new substances. The result is that these new substances produced by man tend to accumulate in nature, and cause eyesores or even have a toxic effect. The solution to this problem might be closed production cycles, where the waste materials could be returned to production as secondary raw materials; this would prevent them accumulating in the bio-sphere. Chemists should not only discover new plastics, but also methods for disposing of them after they have been used.

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857. DUCROS,B.: Une visite den anciennes carriéres de Joinville-le-Pont. /A visit to the old quarries at Joinville-le-Pont./

Biologie-Géologie, 67,1980, No.1, pp.77-78.

The abandoned underground quarries at Joinsville were visited by groups of students accompanied by biology and geology teachers. Each group studied a specific limestone section of the quarry, learned to distinguish cretaceous marly limestone and observed stalactites and stalagmites. As far as applied geology is concerned various types of quarrying stone were compared. The biological group was mostly interested in finding mushrooms of the genus Copirinus and finding centipeds /Myriapoda/. Also from a historical point of view the excursion was interesting and some problems were followed up by a study of old documents.

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858. ENGLAND, A.W.: Technology and the integrated view.

The Science Teacher, 47, 1980, No.6, pp.23-24.

The fact that young people tend to be indifferent to problems of energy, the environment, the production and distribution of food, but also to penetration of space and the biological discoveries of recent decades, has provoked a scientists and astronaut to write this article. He points to the necessity of making young people more interested in and more committed to the problems of their community and the world. Technological solutions form a chain which links together international and local problems. Energy, food production, epidemics, etc. are all problems which the young people of today will have to help solve in the future.

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859. GÓRECKI, A.: Produktywność i gospodarka ekosystemów. /Productivity and the economids of ecosystems./

Biologia w szkole, 33, 1980, No.3, pp.131-135.
4 tabs., 1 fig.

An ecosystem is an biological unit which includes all living organisms which live in a specific area and under specific physical conditions. An ecosystem is a functional unit capable of independent existence. The following components form an ecosystem: producers /especially green plants/, consumers of the first order /herbivorous animals/, consumers of the second order /carnivours - predators/ and consumers of the third order or reducers who disintegrate organic substances at all three trophic levels. In an ecosystem either food chains or complex food networks can develop. Solar energy is bound to the ecosystem only by producers - only 0.5 to 1% of its energy is used in the process of assimilation. In this manner primary gross output is produced. Part of this is used by plants for respiration and the remainder is accumulated as net primary output. Only part of this output is available for higher trophic use. On these producers the consumers of the first order are dependent - the herbivours, which consume only a part of primary production; the remainder is disintegrated by reducers or after some time lost from the circulation of matter in nature /for instance wood used as timber/. Thus part of the consumed energy, through members of a given trophic level, is transfered to the next level, while another part is consumed in the form of heat in the course of respiration, and still another part is transfered through reducers in the form of feces and urine. The remainder is output available to consumers of higher trophic orders /this also includes secondary output produced by the transformation of energy from primary output/.

The described processes take place at all levels of the food chain. The article also contains good diagrams of food chains, trophic levels and the circulation of matter and energy in the ecosystem.

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860. GRUDNEV, S.: Biologichno akumulirane i koncentrirane na metali. /Biological accumulation and the concentration of metals./

Biologiya i khimiya, 23, 1980, No.1, pp.8-12.

A number of micro-organisms are capable of accepting ions of metals from diluted solutions. The biological accumulation and concentration of these metals takes place at the intracellular level. The penetration of metals into the interior of the cell takes place most frequently through a special transport systems active in the cytoplasmatic membrane.

The accumulation of metals on the surface of the cell is connected with active groups. The bio-analytical concentration of metals in the environment is in turn connected with the secretion of various metabolites; some of them bond metal ions in solutions, while others cause their precipitation. In various types of micro-organisms specific processes take place for the exchange of metal ions.

The article describes mechanisms characteristic especially for specific types of bacteria and fungi. Some of these micro-organisms can be made use of in practical processes, for instance in cleaning waste water through a so-called biologically active membrane, for obtaining some metals, in genetic research, etc.

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861. HARRISON, A.W.: Experimenting with solar collection and radiation cooling.

The Science Teacher, 47, 1980, No.6, pp.29-31.
4 figs.

The energy crisis has increased an interest in the transformation of solar energy into practically utilizable heat energy. This interest is supported by the author among school children through two simple experiments which use a glass carboy and an aluminum vessel specially adjusted for this purpose. Both experiments show how temperature rises or falls, down to the range of under freezing temepratures, both when the sun is shining and when it is cloudy and how the black colour/ a coat of black latex paint/ can be used as an effective collector of solar energy. The experiments are suitable for the 8th and 9th classes of secondary school.

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862. HOLDSWORTH, D.K.: Chemical formulas and realistic structures.

The Australian Science Teachers Journal, 25, 1979, No.2, pp.101-103.
3 tabs.

The author briefly describes a laboratory excercise in chemistry in which the students, with the help of minicalculators, calculate various alternatives of formulas for compounds containing carbon, hydrogen, nitrogen and oxygen, in such a way that the resulting compound has a specific molecular weight. Some of the programs for the calculators are cited. The first of them includes all realistic formulas and after they have been used up the machine signals "error". The second program concentrates on nitrogen. When the number of carbon molecules has been used up the programme stops. The article also contains tables which contain samples of formulas used in various programmes. The molecule bonds of the compounds are determined beforehand: in the first case 94 and 142, in the second 70 and 253, etc.

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863. HORNÍK, P.: Několik údajů o historii ekologie. /Several facts concerning the history of ecology./

Přírodní vědy ve společnosti, 31, 1979/80, No.5, pp.170-171.

Already in the years 2000 to 600 B.C. fungicides were known in India. In the 2nd century B.C. arsenic was used as an insecticide in China. The first known textbooks of parasites and pests were published anonymously in 1709-1712 in Nurimberg. The possibility of using biological weapons to combat pests was stressed already in 1800 by E. Darwin, in spite of the fact that 15 centuries previously ants had already been used to combat pests attacking tangerines. E. Haeckel in his book Generelle Morfologie /1866/ for the first time used the term "ecology", which he considered to be the science concerning the economy, way of life and mutual realtions existing among organisms. A. von Humbolt is considered to be the founder of bio-geography and plant ecology; he used the term association /phytocenosis/ for the first time.

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864. HORNÍK, P.: Pohlavní chromosomy u rostlin./Sex chromosomes in plants./

Přírodní vědy ve škole, 31,1979/80, No.10, p.372.

In 1923 Blackburn and Winge for the first time described the existence of two x chromosomes in female plants of the genus Silene and x and y chromosomes in male plants. The campion thus belongs to the same type as Drosophyla. Sex is determined by the ratio x : y. For the determination of the male sex it is sufficient to find at least one y chromosome in the chromosome set. Campions are suitable objects for demonstrating sex chromosomes in class work.

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865. CHARLTON, R.E.: Futuristics in biology: Some techniques. The American Biology Teacher, 41,1979, No.3, pp.136-139. 5 figs.

Many discoveries which will be put to use only in the future are in the field of biology. These include for instance the use of clones, genetic engineering, population problems, etc. For these reasons futuristics are also becoming a necessary part of the school syllabus. In the article the author attempts to sum up some of these techniques which can help students to consider the future. The first method described is the "Delphi technique" developed in the fifties. It can best be characterized as an intuitive method which produces informed forecasts for the future. The students express their opinions in writing in preprinted questionnaire. Another technique used by futuristics is a "collison matrix" where the students are confronted with the mutual influence of various factors. Other methods include "circles of the future" and "decision trees" which analyse various alternatives to sequential decisions. The final method described by the author is the scenario method, where the author presents in various forms, including audio-visual methods, his predictions for the future.

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866. Integrierte Bekämpfung von Getreideblattläusen.
/An integrated struggle against plant-lice in grain crops./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 9, p.264.

Grain crops have increasingly been attacked by plant lice. Often chemicals must be used against them. But when this is done also the natural enemies of plant lice are destroyed, part of the plant lice survive the chemicals and already after two weeks the plant lice population has achieved the same numbers as before the chemicals were used. Since they have thus beenrid of their naturel enemies, their numbers tend to grow unchecked. Hence ways are sought to save the natural enemies of plant-lice when pesticides are applied to the grain.

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867. IVANOV, V.: Biologiya za vsichki. /Biology for all./
Biologiya i khimiya, 23, 1980, No.3, p.59.

In the book "Biology for all" the success of the biological sciences are described, especially those achieved in recent years. The first part of the book deals with the findings of microbiology, the second part with the great secret of living matter - the method of transmission of genetic information to future generations; the third part deals with energy which is concentrated in green plants and the fourth with problems of space biology and medicine. The final part of the book deals with important problems of man's future, which are connected with the conservation of the environment.

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868. JUNGWIRTH, E.: Some biology social interfaces and the teaching of biology.

Journal of Biological Education, 14, 1980, No.4, pp. 339-344.

The author sums up in this article various opinions concerning the effects of biology and biologists on nature and humanity. The effects of biology affect not only the area of the natural sciences, but to an increasing extent, biology is becoming a political and social science and as such it should be taught in schools. The author provides extensive quotations from Marxist literature /mostly from the G.D.R./. His comments on "biologically orientated political science" are very interesting, as well as his discussion of socio-biology, bio-sociology and the problems connected with them.

869. KATTMANN, U.: Genforschung ohne Schranken ?/The study of genes without any limits ?/

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.8, pp.252-253.

The author here supplements the article Wohin führt uns die Genforschung ? /Where is the study of genes taking us? / which was published in the same journal in vol. 28/1979 / on page 281. In the USA a report has been published by the National Health Institute concerning experiments with genes /genetic engineering, the transplantation of DNA sections to another organism, for instance to bacteria/. According to the opinion of American biologists no danger for man exists in the course of these experiments. But in 1974 11 foremost world biologists pointed out the possibility of misusing genetic engineering and the possible danger which might follow from this. One of these scientists was one of the discoverers of DNA, J.D Watson. In 1975, 140 genetists issued guidelines for working with DNA, but in 1979 J.D. Watson and others protested against these limitations. In the Federal Republic regulations have been issued for work with genes and for protection against newly recombined DNA; they concern cleanliness in the laboratory where work with genes is done. It should not be overlooked that in working with living organisms and interventions into them it is necessary to proceed very cautiously.

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870. **LEHMANN**, M.:"Biologie und Ethik - Gespräche auf der Grenze". /"Biology and ethics - conversations at **the border**"./

Praxis der Naturwissenschaften, 29, 1980, No.2, p.62.

On May 26th and 27th a meeting of biology teachers in the Catholic diocese of Rottenburg was held in Stuttgard-Hohenheim together with teachers of religion where the relation between biology and religion was discussed. The papers presented concerned problems of family planning, premarital knowledge of genetic disorders and their significance for society, as well as the possibility of manipulating heredity on the basis of the development of genetics, the importance of genetic couselling for premarital couples, the present situation in the struggle against genetic disease, problems of regulating fertility and family planning and the ethical behaviour of humans and education towards this objective.

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871. LUCAS, K.B.: Velocity of the sun around the center of the galaxy.

The Australian Science Teachers Journal, 25, 1979, No.2, pp.97-103.
3 figs., 3 tabs.

One of the methods of determining the movement of the Sun around the center of the galaxy is to compare radial movements of globular clusters in areas relatively near to the Sun. One such cluster is described in the article, which deals with objects with a brightness of over $M_B= -7,0$, whose distance is known. To determine the relations connected with solar rotation it is necessary to assume that globular clusters do not rotate with the stars at the galaxy plane, but rather that they determine the inner structure of the galaxy center. The author demonstrates this calculation on the example of radial acceleration $/Z_r/$ of the cluster, which is partially accelerated by Z at a plane parallel with that of the galaxy. This problem can also be the subject of a practical excercise. Pupils on the basis of known data concerning several globular clusters can fill in such data for an unknown cluster. They learn to draw conclusions on the basis of graphical representations which are projections of a cluster in an area determined by x and y. They are then able either orally or in writing to answer questions which are cited in the article.

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872. MARTIN, B.: Can scientific development be stopped ?

The Australian Science Teachers Journal, 24, 1978, No. 1, pp.65-70.

In this article the author discusses the problem of the limits of the development of science and technology. He sums up proof which indicates that the idea of the independent development in these fields of endeavour is historically incorrect. He documents this on the basis of actual and potential discoveries in the natural sciences. He also considers the possibility of using various discoveries by the public. While technological discoveries can usually be immediately applied, new theories in the natural sciences can usually be utilized only in the course of several generations. The development of science and technology do not have a pre-set course; one of the reasons for this is that they can be implemented in several manners. The author cites examples from genetics, such as cross-breeding, from electronics /the telephone and TV/ and the making of automobiles. He comes to the conclusion that both technological and scientific development reflects social and political interests. He also argues against the opinion according to which progress cannot be stopped. Such an opinion considers science to be neutral and objective truth seeking regardless of social interests. As is clear from history, such an opinion is not correct.

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873. McLEOD-HETHERNINGTON-TREAGUST : Instilling the energy ethic-activities to live by.

The Science Teacher, 47, 1980, No.2, pp.36-37.

The energy crisis, which in recent years has become worldwide, forces us to limit the use of fuel, especially oil and its products and to seek new sources of energy, which might add to existing sources or could replace them. The authors acquaint readers with the energy situation and would like to open a general discussion on this subject. They cite opinions of students concerning the energy crisis and its solutions, as well as the energy policy implemented throughout the world. The conclusions drawn from the discussion stress various obligations on the part of students, which concern the conservation of energy in households, in schools and social premises where students spend their leisure time.

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874. MOORE, J.A.: The structure of scientific revolutions revisited.

The American Biology Teacher, 42, 1980, No.5, pp. 298-304.

In the century of science it is important for students to know something about the very nature of science. All science instruction should broaden their understanding of nature, but it is also necessary to subject science itself to a discussion of its strong points, weak points and its philosophy. The author discusses scientific methods used since Francis Beacon /1561-1626/ and analyses the development of science up to the present. His explanations are based on a book by Thomas S. Kuhn: 'The Structure of Scientific Revolutions, whose first edition was published in 1970 and 2nd edition recently.

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875. MÜLLER, K. - KAFKA, J.: Jednobuněčné organismy - perspektivní producenti bílkovin. /Unicellular organisms - producers of proteins in the future./ Přírodní vědy ve škole, 31, 1979/80, No.5, pp.168-169. 2 figs.

Substitute sources of food for people, as well as fodder for domestic animals have been a subject of study since the forties. A number of unicellular organisms can be used for this purpose which use oil as a source of energy, as well as oil products or other raw materials which are otherwise of little value to people or which may even be dangerous - such as urban waste, or waste produced by agriculture or in timber production, etc.

As a consequence of the oil crisis the prices of petrochemical products have increased, so that the costs of producing petroproteins has increased by 10% and their cost relation to classical, sources of protein fodder, such as soya or fish meal are much less attractive than earlier. Nevertheless, large-scale production units for making yeast and n-alkane are being built. The rapid development of the micro-biological industry is taking place especially in the USSR. In Czechoslovakia, which has limited sources of oil, the future lies more with the production of yeast fodder made of synthetic ethanol. As far as the production of proteins from sources other than oil are concerned, the future of so called fungi imperfecti, especially Pullularia pullalans which causes mold on cereals and fruit, seems promising. Also protozoa can be important, especially in the disposal of urban, agricultural and food processing waste, from which proteins can subsequently be produced.

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876. NAGALSKI, J.L.: What's basic about biology ?

The American Biology Teacher, 42, 1980, No.2, pp. 113-115,123.

The article is a rejoinder to numerous complaints expressed by colleges, parents and the public concerning the fact that high school graduates do not have any practical skills and because of this changes in the curriculum should be made. Specifically "a return to basic knowledge" is called for. In other words, according to these opinions high schools should provide more simple and less scientific training. The author defines the basic objectives of teaching: to provide students with skills adequate to life in contemporary society and to lead students towards the acquisition of new skills, so as to be able to cope with future changes in their lives. On the basis of these definitions the author discusses opinions concerning "basic" knowledge which should be gained in the biology course taught at secondary school.

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877. NEČAS, J.: Produkční kultivace sladkovodních mikroskopických řas v jižním Bulharsku. /Production cultivation of fresh water blue-green algae in southern Bulgaria./

Přírodní vědy ve škole, 31, 1979/80, No.5, pp.171-172. 3 figs.

A research and output algological laboratory belonging to the Bulgarian Academy of Sciences in Sofia was founded in the Sandansk region near the Greek border. The laboratory is in a crater of an extinct volcano, where a rich mineral spring is found with a CO_2 content and other elements needed for the cultivation medium of algae. The warm climate allows cultivation from the middle of February until the middle of November. The Algological Laboratory of the Microbiological Institute of the Czechoslovak Academy of Science also participated in the building of this laboratory. In the future it will produce a biomass of fresh water blue-green algae and develop its technology for all the countries which are members of the Council of Mutual Economic Assistance.

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878. PICKER, L.: Teaching ecology in the winter.

The American Biology Teacher, 42, 1980, No.1, pp. 49-50.

Usually ecology is taught outdoors in the warm spring, summer or fall weather. But in this way students obtain a one-sided view of nature and know nothing about its winter period. In the article the author describes the course of winter-time excursions, from January to March and the findings observed by students, which differ greatly from what they had known previously.

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879. PONCINI, L.: Americium - An overview.

The Australian Science Teachers Journal, 24, 1978, No. 2, pp.124-126.

Americium was discovered as the fourth transuranic element in 1944, the sixth element in the actinide series. It is abbreviated as Am and has an atomic number of 95. The man most responsible for its discovery was G.T. Seaborg, who received the Nobel Prize for this discovery. He discovered the production of isotope ^{241}Am as the outcome of a sequential neutron reaction of plutonium isotopes in a nuclear reactor. In natural substances it is found in such small quantities that it cannot be determined and for this reason it is made only synthetically. It can be obtained as a metal by the reduction of trifluride americium with barium at temperatures of 1000-1200°C. Its structure is hexagonal, in contact with air it reacts with oxygen and hydrogen. Americium has been found in solutions of acids in trivalent, pentavalent and sexavalent states, while tetravalent forms are instable and do not exist in solutions. Trivalent americium is quite similar in its reactions to other trivalent actinide and tracer elements. The main isotope of ^{241}Am has a number of important industrial uses because it is a source of gamma rays. Its neutron radiation is a source of curium 242 which is used as an isotope source.

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880. PROLL, E.: Anwendungsmöglichkeiten der Ultrazentrifugation in der Phytopathologie. /Opportunities for using ultracentrifugation in phytopathology./

Biologie in der Schule, 29, 1980, No.2/3, pp.106-109.

4 figs.

Ultracentrifuges are centrifuges whose rotor has more than 15 000 rotations per minute. The first one was developed in 1926 in Sweden by T. Svenberg, who used it to identify the polymolecular quality of organic and inorganic colloids. Due to his work a so-called sedimentation coefficient has come into use, whose value is expressed in Svenbergs /S/, where one S = 10^{-13} seconds, which is in accord with a centrifugation force of 600 000 g /g=9.81 m x S^{-2}/. Ordinary laboratory centrifuges achieve between 3000 and 20 000 x g. On the basis of their design we can distinguish analytical and preparative ultracentrifuges. The author explains their design and the opportunities they provide for phytopathology - especially in the study of pathogenic viruses. This is analysed in detail.

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881. RENON, P.: Épistémiologie groupe "Tectonique des plaques". /The epistemology group "Plate tectonics"./
Biologie-Géologie, 67, 1980, No.1, pp.95-97.

The author of the article compares various hypotheses concerning the forming of the continents, beginning with Francis Bacon /1620/. She cites the opinions of various foremost scientists who have been unable, since the development of science on this subject in 1858, to achieve any degree of unity. Contradictory opinions have caused difficulties in instruction. The author quotes Wagner who in 1912 expressed specific opinions on the rise of the continents according to which the geology syllabus used in the third class has been written. By this the author wants to demonstrate that much has been done in this area, but still no theory has achieved universal acceptance.

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882. RUBÓCZKY, I.: Híd a biológia és technika között.
/A bridge between biology and technology./
A biológia tanítása, 19, 1980, No.2, pp.58-63.

The author describes the importance of bionics, which developed as a combination of biology and technology, as a consequence of the scientific and technological revolution and enumerates its main topics of study:

- the principles of the functioning of living organisms,

- systems according to which living organisms function,
- the possibility of controlling the functioning of machines,
- the structure of living systems.

The author discusses the history of bionics in connection with various technical discoveries which were in some way connected with living nature /for instance aerodynamics and the relation between airplanes and birds, hydromechanics and the relation between ships and dolphins, ultrasound systems and the connecteion between radar and the sensors which bats and dolphins have, etc./. At present this science has already borne fruit, but many more tasks await it. It could contribute to an improvement in the quality of technical products, to energy savings, higher efficiency and performance, etc. On the basis of the many sided aid which bionics has provided to technology it seems clear that also pupils in school should become acquainted with the basic concepts of this science.

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883. SHEPPARD, R.R.: Introducing virological concepts using an insect virus.

The American Biology Teacher, 42, 1980, No.4, pp. 219-222.
5 figs.

The topic of viruses should be a part of every biology syllabus. A knowledge of the basic structure and chemical composition of viruses and the cellular and organic symptoms of viral disease and processes by which viruses influence the cell makes it possible for students to better understand the general concept of life and the activity of the cell. Since viruses are usually overlooked by most syllabi, the author here suggests that they should be studied and practically experimented with on the basis of insect viruses which are not dangerous to the human organism and can be followed throughout their development; this is also easier to do than with other viruses. The author describes laboratory and microscopy work with the virus PAYHEDRA.

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884. SCHAEFER, J.H. - PETER, K.: Einfache Diagnose von Bakterienkrankheiten. /A simple diagnosis of bacterial disease./

Biologie in der Schule, 29, 1980, No.2/3, pp.109-114.
11 figs.

There are more than 200 plant disease caused by bacteria throughout the world. In the G.D.R. at least 10 plant disease of bacterial origin are economically important. The authors concentrate on Pesudomonas syringae /which damages sour cherries and other drupes/ and Erinia carotovora var. atroseptica /which attacks potatoe tubers/. The authors describe symptoms, diagnoses and methods of conservation.

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885. SHELLHORN, M.: Weltanschaulich-philosophische Aspekte der Autökologie. /World outlook and philosophical aspects of auto-ecology./

Biologie in der Schule, 29, 1980, No.10, pp.401-407.

Auto-ecology deals with relations between organisms and their environment. There have been a number of discussions concerning the philosophical implications of auto-ecology and its consequences, which teachers should be aware of, so as to better develop the dialectical and materialistic thinking of their pupils. The author first discusses the purposefulness of organisms. He stresses the relativity of this notion(something is purposeful only under specific conditions and from a specific point of view/ and points to the dangers of teleology and Lamarckism. The foundation for the harmony of an organism and its environment are the matter, energy and information factors in the environment. The author also discusses the internal and external contradictions which exist in an organism. In the process of metabolism the internal contradictions of an organism are reproduced through the contradictory processes of synthesis and disintegration. An analogical situation exists as far as information is concerned. When these contradictions no longer exist the organism dies. In ontogeny these contradictions are manifest for instance in the morula, where the upper animal pole has the tendency to form an ectoderm, while the lower, vegetative pole forms an endoderm. In conclusion the author explains the quantitative and qualitative changes which occur in ontogeny in view of the incidence of the haploid stage and the diploid stage and the relation of random and necessary factors in ontogeny.

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886. SCHELLHORN, M.: Weltauschaulich-philosophische Aspekte der Demökologie. /The world outlook and philosophical aspects of demecology./

Biologie, in der Schule, 29, 1980, No.11, pp.449-455.

This article informs the reader of those philosophical principles of demecology which teachers should know about for teaching in the 9th to 11th classes. Demecology /or population ecology/ studies the relation between population and the environment and seeks the dialectical unity between population and the demotope. The author first discusses population as the elementary unit of evolution. Population is defined as the reproduction of a community, as a system of organisms of a single specie. It also includes polymorphism, based on genetics and the tendency towards reproduction. Shmalgausen considers it to be the basic unit of evolution. From a cybernetic point of view it can be considered a regulated object, where the biocenosis has the role of the regulator. These ideas have successfully overcome all organismocentrical opinions. In the second part of the article the author deals with the impelementation of evolutionary trends in a population. Each alternative whichappears in a population can become the point of departure of new development. But in an actual population, of the many existing alternative only one is actually implemented /this is a random process/. This trend /which seemingly aims at some objective/ is called an evolutionary trend. The term trend of development should be understood as existing only ex post /it is related to past evolution/. Pre-adaptive symptoms make it possible for a population to penetrate a new environment and this should not be considered as teleology. Adaptive plasticity is a necessary condition of development of a population, adaptation is the implementation of the practical possibilities provided by a given adaptive plasticity. Adaptation is carried out through heredity, mutability and selection, all of which are statisticall processes. The author explains their essence, as well as factors influencing the evolution of a population which is influenced by mutations, selection, isolation, occasionally also through recombination and by other population waves.

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887. SCHMIEGER, H.: Der Fluktuationstest von Luria und Delbrück. /The Luria-Delbrück fluctuation test./
Praxis der Naturwissenschaften-Biologie, 29, 1980, No.9, pp.260-264.
3 figs.

The incidence of bacteria resistent against anti-biotics represents an important medical problem. In the majority of cases resistant bacteria are in fact bacterial mutants whose hereditary changes have been cause by the permeability of the cell wall or by changes in the place where the anti-biotic acts upon the bacterial cell. The discovery of bacteria resistant to antibiotics was a great surprise to physicians. Among approximately 10 million bacteria /10^7/ there is only one resistant to antibiotics which survives; it multiplies and gives rise to a resistant strain of bacteria. After the experimental verification of the problem, out of the three possible explanations only one remains: It was thought that every bacterial cell is sensitive to contact with antibiotics, which provokes resistance against itself in the bacterial cell, or that every cell has the same small liklihood that in contact with an antibiotic it will adapt and that this new quality will be transmitted to its posterity and finally, the version which was shown to be the only true one, that in a bacterial culture without external causes and independently of the antibiotics, a spontaneous mutation with a liklihood of 10^{-7} occurs of a resistant bacteria. By adding the antibiotic the other bacterial cells are killed and this "selection" leads to the multiplication of the resistant bacteria. The author recommends carrying out an experiment concerning this topic, using Escherichia coli with a sulphate solution of streptomycine. The bacteria for the experiment can be cultivated in an agar medium.

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888. SCHMIEGER, H.: Resistenz gegen Antibiotika - eine gentisch bedingte Erscheinung. /Resistance against antibiotics - a genetically condition phenomenon./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.9, pp.257-280.
1 fig.

For a long time it was not clear how bacterial cells resistant to antibiotics developed. There were two theories, one of which was one of the last bastions of Lamarckism in biology, while the second was founded in Darwinism. According to the Lamarckian theory the bacterial cells adapted to a new environment formed by the antibiotics and the posterity of these bacterial cells were then resistant to antibiotics. The Darwinian theory claimed that resistant bacteria are present in a bacteria population, that they develop independently of the presence of antibiotics, as far as time and the factual situation is concerned, on the basis of spontaneous mutations. In other words they are already present in a bacteria population before contact with antibiotics, even if in very small numbers. The antibiotics destroy all bacteria which are not resistant. The very small number of resistant bacteria then multiplies and a population develops which is entirely resistant to antibiotics. The author divides antibiotics into two groups; the first acts in a bacteriostatic manner /it does not kill bacteria but prevents their growth/ such as sulphonamides, while the second group acts as a bacteriocide /it kills bacteria/, for instance penicillin . The author also describes the effects of the antibiotics used at present against bacteria and the importance of correct dosages and the use of antibiotics in such as way as to prevent the rise of resistant strains /combined antibiotics/. He also discusses the mechanism of this resistance. The classical experiments carried out by M. Demerce with Staphylococcus aureus are described: they lead to entirely resistant strains of bacteria towards penicillin.

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889. SLOANE, E.: Dispelling myths about female potential.

The Science Teacher, 47, 1980, No.7, pp.15-21.
5 figs.

After centuries of deeply rooted traditions which denied women the mental potential and practical abilities in comparison to men, it is now clear that they are based on myths which are rejected by the author in this extensive study. She first considers the physiological aspects of women and the hormonal processes which take place in a feminine organism and on the basis of a careful analysis she comes to the conclusion that women do not have any physical, intellectual or physiological differences which might prevent them from doing work which is traditionally considered to be men's work. She cites various arguments and examples from existing conditions and comments the future of women under conditions where the demands made upon work continue to increase.

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890. SWINDELL, R.: Energy alternative in Australia - Part 2. Bridging the energy gap.

The Australian Science Teachers Journal, 26, 1980, No.1, pp.35-43.

An essay on the contemporary and future situation in energy output and the possibilities and limits of other energy sources, which is addressed to teachers. The author first discusses coal and the problems of its mining, transportation and efficiency. Another energy source is natural gas, which is also accompanied by a number of drawbacks. Water energy, sugar cane waste used as fuel, wood and other rapidly growing plants are now the subject of study as possible alternative sources of energy. Also accumulated solar energy is mentioned, as well as extracting oil from shale. Also the pros and cons of nuclear energy are discussed and the outlooks for its practical utilization.

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891. THEISS-SEUBERLING, H.B.: Ein biologiedidaktisches Konzept. /A biological and didactical concept./

Praxis der Naturwissenschaften, 29, 1980, No.3, pp.70-74.
3 figs.

The author describes the methods by which biology as a science acquires its findings. In the first part of the paper, 6 methods for obtaining biological findings are indicated. However, this does not exhaust the problem. The author also points to the importance of carrying out an extensive analysis of biology as a specialization, its interdisciplinary relations, social and cultural content, chronological method of approach to analysis, problems connected with the content of biology instruction, a humanistic understanding of biology, etc. The latter is discussed from the point of view school biology teaching.

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892. VIGUE, L.C.: Towards a more realistic view of science and the scientific method.

The American Biology Teacher, 42, 1980, No.4, pp. 235-237.

The author opposes the widely accepted view that science arrives at definitive findings in stages which lead from formulating a hypothesis, to experiments, to the formulation of a general rule or law. He rejects the opinion that a method step by step mechanically and systematically uncovers the secrets of nature while maintaining strict objectivity during the whole process. He provides his own opinions on the solving of a scientific problem and the formulation of a hypothesis, objectivity and subjectivity, science and imagination. He also provides quotations from various leading scientists in biology in connection with the problem of whether science is really almighty.

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893. **WUKETIS, F.M.:** Die Structur der Biologie als Naturwissenschaft. /The structure of biology as a natural science./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.3, pp.65-70.
2 figs.

The structure of biology can be approached in various ways. We can stress the elementary problems of biology /what? how? for what? from where?/ and basic types of explanations for biological phenomena /causal, functional and teleological/. The methods used by contemporary biology form a complex of methods which lead to biological thinking. The author considers evolutionary theory to be the foundation for biological theory as such; all other partial biological sciencees, such as physiology, genetics, molecular biology, cytology, anatomy, systematics, ecology and ethology are based on it. Evolutionary theory represents an integration of various partical biological disciplines, and conversly, evolutionary theory includes in itself the findings of all partical biological disciplines. At the same time evolutionary theory is the foundation for the structure of modern biology. This approach is basic to biology instruction in schools. For this reason the author recommends teaching in school also the history of biology as a science and its gradual development. The structure of biology as a science should also become the structure of biology as a teaching subject.

15.1

894. BÖHME, H.: Der photosynthetische Elektronentransport und die Photophosphorylierung. /The photosynthetic transportation of electrons and photophosphorilation./

Praxis der Naturwissenschaften-Biologie, 29, 1980,
No.10, pp.296-302.
9 figs.

Photosynthesis can be defined as the transformation of light energy into biochemical energy. This process takes place in chloroplasts, or to be more precise in the membranes which contain chlorophyll. Electrons transported by light are bonded by the synthesis of phosphate adenosintriphosphate /ATP/. The whole course of this process is not yet entirely understood. The author deals with those aspects which have already been clarified. He describes the light and dark stages of photosynthesis, Hill's reaction in the membranes /$NADP^+ + H_2O \xrightarrow{light} NADPH + H^+$ A 1/2 O_2 and the course of phosphorilation of ADP + phosphate $\xrightarrow{light}$ ATP + H_2O, the structure of membranes, the vectorial transport of electrons and the proton gradient, as well as ATP synthesis. Also the descriptions of some experiments concerning photosynthesis which can be done in school are attached.

15.1

895. DITTRICH, P.: Photosynthese und Umwelt. /Photosynthesis and the environment./

Praxis der Naturwissenschaften-Biologie, 29, 1980,
No.10, pp.302-310.
3 tabs.

The author deals with the significance of photosynthesis for the environment and the problem of energy from a biological point of view. Also the problem of the accumulation of carbon dioxide in the atmosphere, which is the cause of the so-called glass-house effect, is discussed. By photosynthesis plants on Earth annually form about 1.6×10^{11} tons of dry matter, whose energy content is equal to 3×10^{21} Joules, which is 10 times larger than the global consumption of energy. Of this, only 1% serves as food for man. The annual flow of solar energy is 5.6×10^{24}; of this only a small fraction falls directly to the Earth. 35% is held back by clouds and by diffusion radiation is returned to space. 20% is absorbed by water vapours, carbon dioxide, dust and pollution in the atmosphere. Only 45% actually comes to the Earth. Photosynthesis makes use of only 0.12% and plants in the process of photosynthesis make use of only a small range of wave lengths /between 400 and 700 nm of the light spectrum/. There are 1.2×10^{15} tons of oxygen in the atmosphere and $2,6 \times 10^{12}$ tons of carbon dioxide. Annually the amount of carbon dioxide in the atmosphere increases by 15.6×10^{9} tons for which 11.3×10^{9} tons of oxygen are used up. In other words every second the atmosphere irevocably loses

360 tons of oxygen. Annually this is only 0.01 promile, but in a thousand years the amount of oxygen will decrease by 0.2% at the existing annual output of oxygen by plants, i.e. 9.4×10^{10} tons.

15.1

896. FROMHOLD, I.: Native und Synthetische Wachstunsregulatoren bei Pflanzen und ihre Bedeutung für die Praxis. /Natural and synthetic growth regulators of plants and their importance for practical use./

Biologie in der Schule, 29, 1980, No.2/3, pp.95-105. 12 figs.

The ontogeny of higher plants includes the vegetative stage /the germination of a seed, the forming of the plant axis and roots/, the generative stage/ forming blooms and fruits/ and the rest stage /embryonal/. Regulation is carried out by phytohormones. These are substances formed by plants, which in very low concentrations either brake or accelerate plant growth. They are not specie specific or organ specific, but rather in one and the same organ they carry out different functions. Natural phytohormones can be divided into auxines, giberalines, cytokinines, ascorbic acid and ethylene. The author analyses each group, its history, incidence and effects. Next the article deals with synthetic growth regulators, which can be either analogs or antagonists of natural phytohormones. These include retardants, regulators of blooming and ripness of fruits, stimulants and depressors of germination and defoliants. In conclusion the author describes 2 simple experiments which make it possible to demonstrate the effect of these hormones - the influence of ethylene on the growth of peas and the ripening of tomatos. Apples can be used as a source of ethylene.

15.1

897. HOUFEK, J. - LEPŠ, J. - PRACH, K.: Základní poznatky z rostlinné ekologie. /Basic knowledge concerning plant ecology./

Přírodní vědy ve škole, 31, 1979/80, No.6, pp.204-207. 2 figs.

The article contains basic definitions on plant ecology and geo-botany and defines the subject of study and classification of these disciplines. It also discusses energy flows and the circulation of matter in the bio-sphere and analyses the most important biotic and antibiotic factors of ecology.

15.1

898. HOUFEK, J. - LEPŠ, J. - PRACH, K.: Základní poznatky z rostlinné ekologie II. /Basic knowledge concerning plant ecology II./

Přírodní vědy ve škole, 31, 1979/80, No.7, pp. 246-248.
1 fig.

The notion of succession is very important in ecology. It concerns a series of changes in the composition of vegetation and soil properties as a consequence of which a specific place is overgrown with vegetation in dynamic equilibrium with the environment. The succession of plant communities is designated as a succession series. Another important notion is the structure of the ecosystem. A horizontal structure can be distinguished, which is characterized by a distribution of its biomass of various species at the horizontal plane and a vertical structure, where the biomass is distributed at various heghts and also perhaps underground. Also an ecological niche of a specie is explained, which is an expression of the general relationship between a living organism and its complete biotic and abiotic environment. In conclusion the article provides a terminological dictionary of most important ecological terms.

15.1

899. KUKAN, Š.: Čerstvé huby na vianoce alebo na Silvestra.
/Fresh mushrooms for Christmas or New Years Eve./
Přírodní vědy ve škole, 31, 1979/80, No.4, p.133.

When a winter is mild and not too dry, alongside streams and on the trunks of dead willows or other deciduous trees the mushrooms Flammelina velutipes and Collybie velutipes can be found. They are very tasty and especially suitable for making soups. They can also be broiled.

15.1

900. **MOWSZOWICZ, J.:** Zapylanie i zapłodnienie roślin nasiennych. /The pollination and fertilization of spermatophyta./

Biologia w szkole, 33, 1980, No.3, pp.162-167.
4 figs., 1 tab.

Spermatophyta are divided into gymnosperms and angiosperms. The author provides definitions of blooms, pollination and fertilization. He describes the structure of a bloom and its individual parts, microsporophytes, microsporangia, microspores, archesporium, etc. He describes bisexual, heterosexual and unisexual flowers and hermaphrodites. Pollination can be divided into pollination by the plants' own pollen or by that of another plant /xenogamy, allogamy/. In autogamy, which is the pollination by the plants' own pollen, sometimes the plant need not even produce a bloom which opens; this is called cleistogamy and can be found in violets. Examples of anemophilous plants are given /anemogamy/; these plants produce large quantities of pollen, which are very smooth. Some plants are pollinated by water /hydrogamy/, others by animals or insects or birds such as hummingbirds or bats /in the tropics of subtropics/ or even by molluscs. Angiosperms have dual pollination for the development of the embryo and nutritive tissue /endosperm/. Seeds can be transported by the wind, water, animals and by man. The transmission of seeds and fruit by the wind is called anemochory, by water hydrochory and by animals zoochory.

15.1

901. **NEČAS, J.:** Perspektivy řas při výzkumu kosmu.
/The future of algae in space exploration./
Přírodní vědy ve škole, 31, 1979/80, No.9, pp.328-331.

The utilization of algae in space explorations does not as yet have a long tradition. Their greater proliferation is expected in the near future. Algae can serve as testing organisms for determining the influence of space conditions upon the structure of the cell. They will also be of great importance as a source of biomass for making food and as a stabilizing factor in the atmosphere of a space ship, for the exchange of CO_2 and O_2.

15.1

902. **ROWLAND, J.T.:** The carnivorous fungi.
The American Biology Teacher, 41, 1979, No.4, p.
238, 244.

Under the category of carnivorous plant usually spermophyta are included, such as for instance the sundew /Drosera/. However, also a number of microscopical fungi come under this category, which are sometimes designated as "nematophagous fungi". The author describes the main methods by which these fungi acquire their prey, in the majority of cases roundworms. Carnivorous plants, including these fungi, can also become a subject of instruction. For these purposes Cook's method of using agar plates seems best suited. The pupils can follow the influence of the cultivation when roundworms are present and without them. The author also recommends Barron's book, published in 1977, about the collection, cultivation and observation of nematophagous fungi.

15.1
903. SCHILLING, N.: Oekologische Varienten der Photosynthese. /Ecological alternatives of photosythesis./
Praxis der Naturwissenschaften-Biologie, 29, 1980, No.10, pp.289-295.
5 figs.

The assimilation of carbon dioxide in plants takes place by three methods: we are now able to distinguish C_3, C_4 and CAM plants. The article deals with C_4 and CAM type plants, as well as with the mechanism of physiological movements of sphincter cells /ducts/. This article continues in the subject-matter of an article called "Photosynthesis" which was published in 1980, No.4 of this journal. A leaf of maize in our geographical latitude will accept more carbon dioxide per unit of leaf area than for instance wheat. Maize is a C_4 type of plant, which also includes sugar cane, tropical grass, etc. The author describes the mechanism of bonding of carbon dioxide in C_4 plants. In conclusion the author also describes some CAM type plants, among which are the succulents. This type of plant assimilates carbon dioxide at night /diurnal cycle/.

15.1

904. **VENT, W.:** Das Arboretum der Humbolt-Universität und seine weitere Entwicklung. /The arboretum at the Humboldt University and its further development./

Biologie in der Schule, 29,1980, No.4, pp.157-164.
4 figs.

In 1945 the Humboldt University lost its arboretum as a scientific facility. In 1961 it gained new premises. The arboretum was founded in 1964 and in 1966 it began to serve its purpose. During 1979, 28 400 people visited it. Besides trees there are also other plants /a total of 5 000 species and subspecies, of which 1231 are woody species/. Instruction takes place on the basis of the Takhtadshayan system. The library has more than 11 000 volumes.

15.2

905. **ABEL, G.:** Aperçu sur la faune de la Guyane Française. /An encounter with the fauna of French Guyana./

Biologie-Géologie, 67, 1980, No.1, pp.115-126.
6 figs.

The fauna of French Guayana is still little known. Some parts of the country have not yet been explored in detail. In the article the author introduces the reader to selected species of fish, marine and terrestial turtles, several species of cayman and lizards. Also a number of birds are described, including several species of ibis and hummingbirds, cat predators and some invertebrates. The Guayana cayman is given greater attention; especially their biology and behaviour is described. They are now a threatened specie because of commercial hunters. The geological past of Guayana is described in connection with the geology of the country.

15.2

906. **ABEL**, G.: Aperçu sur la végetation en Guayane./An encounter with the vegetation of Guayana./ Bielogie-Géologie, 67, 1980, No.1, pp.111-115.

The subject of this article is a brief description of the vegetation found in the coastal and mountain areas of French Guayana, Mangrove vegetation is typical for the coastal area; in this area fresh and sea water tend to mix and fresh water as well as semi-marine marshes form, as well as savanahs with low and high vegetation. On the beaches the vegetation is specific for that area and secondary vegetation exists in places where human activities have destroyed the original vegetation. Forest plants, which are often accessible only by boat or by airplane make up mangroves more distant from the coast; these gradually change into marshland as one nears the coastal area.

15.2

907. DORST, F.W.: Kaninchen .... unbeliebt ? /Is the rabbit... unloved ?/

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.3, p.94.

The European rabbit has again multiplied and tends to cause damage to parks and gardens. The problem now is how to prevent rabbits from coming to these places, where they damage flower beds, alpine gardens and decorative shrubs. The author points to the possibility of mechanically combating rabbits /glass splinters do not really help/, or chemical methods /pre-prepared calcium carbide or metasystox R - blue liquid/. The smell of these substances repels rabbits in areas where they are not wanted.

15'2

908. GRUPE, H.: Bisam und Nutria dringen vor. /Muskrats and nutria are proliferating./

Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.1, p.14.

The numbers of muskrats and nutria found in the Federal Republic have recently been increasing. Both have been penetrating places in which they have never been found before, for instance across the Danube in the west and south. It is there that they are causing damage to river banks and the nets of fishermen. In 1977 in Baden Württenberg there were 7 official and 113 private muskrat hunters. During a single year 13 669 muskrats and 21 nutria were caught.

15.2

909. JASIŃSKI, A.: O zwierzatach posługujacych sie narzędziami. /On animals which use tools./

Biologia w szkole, 33, 1980, No.1, pp.25-28.
2 figs.

The art of using tools is not a unique characteristic of man. Today we know that some mammals and some birds are capable of obtaining their food by using tools. The look of the instrument is not important, nor is its composition, but only its method of use. Some animals use instruments at the time of reproduction. Pieces of bark, blades of grass, leaves, thorns from cactuses, stones or pieces of rock can all serve as tools. The Bearder vulture /Gypaetus barbatus/ allows large bones to fall on hard rocks and when the bones break, he licks the marrow with his tongue. The Egyptian vulture /Neophron percnopterus/ takes a stone into his beak and uses it to break ostrich eggs. In a similar manner Hamirostra melanosternon from the family Accipitridae, which lives in Australia and Tasmania, uses rocks to break the eggs of the emu ostrich. Australian and New Zealand birds Sericulus chrysocephalus and Prilonorhynchus viokaceus build a pavillion to court females and decorate the pavillon with coloured saliva /the former uses leaves for the structure, and the latter pieces of bark/, while another species of Australian and New Zealand birds build pavillons decorated with various stones, shells, conches and flowers. The American nuthatch /Sitta pusilla/ uses pieces of bark for scraping out insects and their caterpillars from cracks in the bark of trees. Some species of birds

/ Camarhynchus pallidus/ from the Gallapogos, 6 species of the genus Geospira, 6 species of the genus Camarhynchus, one specie each of the genera Certhidea and Pinarolaxias use thorns of cacti to hunt insects and caterpillars. The ability to carry on this type of hunting is hereditary. Among mammals the chimpanzee, Capuchin monkeys /of the genus Cebus/, the Sea otter /Enhydra lutris/ all use tools to obtain food. In conclusion the author of the article also mentions dialects of birds and how they can be recorded.

15.2
910. **KELLEY, G.W.Jr.:** The little dragon of Medina.

The American Biology Teacher, 41, 1979, No.1, pp. 44-47.
3 figs.

The article deals with the longest nematode which parasites in the human body - the Guineaworm /Dracunculus medienensis/. Some historical aspects of the problem are cited about this parasite, which annualy attacks over 50 million people in the Middle East, in central Africa and in India, The life cycle of the parasite is described and methods used to treat those afflicted by it. Treatment assumes surgical intervention during which the long worm is wound on a hard object - in the past a stick was used. The author also considers the symbol of the medical profession in ancient Rome and today in this context. The article also discusses some of the complications which can occur after the parasite has been removed from the body /tetanus infection, etc./. In conclusion the author discusses problems of life styles which make affliction by this parasite possible.

15.2

911. **MALCHEVSKIY, A.S.:** Zvukovaya kommunikatsiya ptits.
/Sound communication among birds./
Biologiya v shkole, 54, 1980, No.6, pp.14-18.

The class aves holds prime place among animals as far as the number of sounds it produces is concerned. This study provides a survey of sound signals produced by birds /in a single specie as many as 25 different signals can exists/. The author divides signals into four groups: those connected with courtship, defense, expressing comfort and discomfort. A sound signal cah be modified by emotions /for instance information on danger/; also situation type communication exists, as well as non-voice sounds which are used for information transmission; they are produced in the course of flight, taking off, landing and feeding and are always specific. Also various types of spring songs sung by birds are described and their biological significance.

15.2

912. **MARCHLEWSKA-KOJ, A.:** Rola bodźców wechowych w życiu społecznym ssaków. /The significance of olifactory stimulation in the life of mammals./

Biologia w szkole, 33, 1980, No.4, pp.232-236.

Hearing and sight communication among mammals are better known and understood. But also the less known olifactory method of communication is important. The author describes olifactory orientation and communication among mammals. In the majority of mammals smell is well developed. In insects, ferromones are known; they are chemical substances which make communication within a population and among individuals possible. Chemical substances used by mammals for olifactory communication are also designated as ferromones. They are formed in epidermal glands whose location and number differ in different species. In mammals ferromones are also found in urine. The author describes findings on the study of ferromones in Australian rabbits, sheep and lambs and in brown rats. In the latter, young rats in a litter

not find the nipples of the mother according to remnants of milk but by the secretion of olifactory glands found in the close vicinity of the nipples. In rabbits olifactory signals are also important as a status symbol and express social hierarchy, dominance and submission.

15.2
913. MEDNIKOV, B.M.: Yestestvennaya sistema zhivotnikh i filogeniya. /The natural system of animals and phylogeny./

Biologiya v shkole, 54, 1980, No.1, pp.6-13.

In the introduction the author points to general problems of classification of organisms and stresses the necessity of simplifying the systematics of animals as they exist in the phylogenetic "tree of life". General problems are made specific in the context of explaining zoological systematics which are shown in an instructive diagram. The main drawback of existing systematics, in the author's opinion, is the fact that they do not reflect the fact that various phyllums and their classes have developed at various times. For instance it is impossible to express the fact that flatworms and annelida developed in the Cambrian era while chordata developed much later. The inclusion of so-called "subsequent" classes into a phyllum /groups with indistinct classification/ introduces artificial elements into the system. In the future new discoveries and/or changes are probably going to occur in the systematic place of araneas, of some invertebrates, of some choradata, /fish, amphibians, reptiles/ and also of some mammals /cetecea/.

15.2
914. ROGOZHKIN, A.G.: Sobol - krasa zemli russkoy. /The sable the pride of the Russian land./

Biologiya v shkole, 54, 1980, No.3, pp.18-25.
7 figs.

At the beginning of the XXth century the Siberian sable was close to extinction, while today 600 000 to 800 000 individual sables live in the wilderness. Also the breeding of sables in captivity is very successful. There are 7 breeding State Farms for this purpose. A mark of this success has been the breeding of a black sable by the Pushkin State Farm in the Moscow region, after 40 years of selection. The article describes the zoological aspects of the sable: it is a typical terrestial predator living in the taiga, which eats various small animals. The finding that copulation takes place in the summer months was very important for breeding. The embryo, however, develops very slowly, for 7-8 months, and one and a half months before the litter is born the embryos grow very rapidly /in April and May/. At this time pairs of sables come together again and the male helps the female in care of the litter. In conclusion the author describes various interesting facts about keeping sables in captivity and the experience of the author who for several months kept a sable in his apartment.

15.2
915. SCHMIDT-KOENIG, K.: *Tierwanderungen - Probleme und gegenwärtigen Stand der Forschung.* /The migration of animals - problems and existing state of research./
Naturwissenschaften im Unterricht-Biologie, 28, 1980, No.12, pp.413-419.
5 figs.

The fact that animals migrate is generally known. Even insects migrate. The most famous is the migratory grasshopper who in large areas of Africa and Asia causes extensive damage. The causes of its migration are now well understood and this understanding is used to combat the grasshopper. Also the migration of libellula are known to exist, but are not yet well understood. On the other hand the migration of the American Monarch butterfly has been studied extensively: there are four summer generations, and only the fifth summer generation flies south to Mexico /a distance of 4000 kilometers/; it survives the winter in the Rocky Mountains. Among vertebrates, the migration of salmon have been extensively studied. It was found that they return to the same rivers in which they hatched from roe. Also the turtle has been found to migrate for long distances, for instance one of the turtles living in the Atlantic ocean, lay their eggs on the island of Asuncion, then migrate 2000 kilometers and come back. The best known is the migration of birds, who make use of the Earth's magnetism and the position of the sun and stars to find their way. Some birds annually migrate for as far as 30 000 km. Among mammals, some cetacea migrate, for instance American whales, dolphins and pinnipeda such as seals and sea lions. Land-living mammals migrate also large distances: for instance the zebra and gnu of Africa, the American bison, Caribou reindeer and bats.

15.2

916. WALLACE, P.A.: Ecology and evolution of animal behaviour. Journal of Biological Education, 14, 1980, No.1, p. 79.

A review of a book which will be of great interest to students; it is not a textbook or an instruction manual for the breeding of animals. It deals with various aspects of ethology such as driving force, motivation, learning, communication, social behaviour, altruism. All these problems are considered within the broad framework of biology and in relation to ecology and evolution. The first edition of the book aroused great interest among student.

15.2

917. ZUCCHI, H.: Wandernde Insekten - Uebersich über unseren Wissenstand. /Migratory insects - a survey of our knowledge./

Naturwissenschaften im Unterricht, 28, 1980, No.12, pp.419-425.
5 figs.

The migration of animals is known to exist not only among vertebrates, but also among invertebrates, mainly among insects. Under stable living conditions insects do not migrate much, but in areas with large climatic fluctuations, for instance in the semi-arid areas of the southern holartic regions, the number of migratory insects is much larger. Migratory insects can be divided into several groups: those that migrate on a seasonal basis /for instance the Asian grain plant-louse/, partially migratory insects, where only one generation undertakes one of two migrations or part of one return migration, emigrational insects, who do not return to the original area /for instance the Death's head moth/ and irregularly migratory insects such as the migratory locust. The author describes in detail these various orders of insects and their representatives. Also the methods of migration used by insects are described, as well as comparisons of insect migration and bird migration. The problems connected with a study of insect migration are described on the basis of the example of the order Odonata /which includes libellula/, Orthoptera, Heteroptera, Homoptera, Hymenoptera, Diptera and Coleoptera, as well as Lepidoptera /butterflies/. Also the information provided about butterfly migration is very interesting -the author describes three European species: the Red admiral, Vanessa and Gamma moth.

15.3
918. CRAVETS, M.: Flight into learning.

The American Biology Teacher, 41, 1979, No.5, pp.303-305.

The author describes some aspects of commercial passager flights, which can be used in class work. Professional pilots suffer from a number of problems, such as general weakness, lack of orientation, hearing disorders and loss of equilibrium, as well as circulatory disorders, disease of the legs, skin problems, respiratory disorders, etc. These problems can be made use of in health-care instruction, in ecology teaching, etc. An interesting problem for instance is the continued work of pregnant airline hostesses, which has been a subject of study by Scholten, as well as the subject of work done by Tobias concerning the effects of noise on the hearing system of airline employees. Also articles concerning the effect of ozone on flight personnel and the psychology of flying are recommended.

15.3

919. MALÁ, H. - FIŠEROVÁ, J.: Puberta a sekulární akcelerace ve vývoji české mládeže. /Puberty and secular acceleration in the development of Czech youth./

Přírodní vědy ve škole, 31, 1979/80, No.1, pp.3-6.
1 tab., 4 graphs.

Puberty is a period of development in which a number of morphological and physiological changes take place and the organism of the child changes into that of an adult. From the point of view of the functioning of sex hormones and the development of secondary sexual characteristics, this period can be divided into three stages:

1. pre-puberty /9-13 years/ - the level of sexual hormones in the blood increases and the first signs of secondary sexual characteristics appear, as well as accelerated growth.
2. puberty /13 - 15 years/ the period of menarche in girls and the first seminal discharges in boys which lasts until achieving full reproductive abilities.

3. adolescence or postpuberty /15 to 20 years/- completion of growth and skeletal development, the full development of muscles; mental and social maturity.

Secondary acceleration is an objectively existing phenomenon which characterizes changes which have occured in the course of the XXth century in the biological development of children and youth. This is a generally existing trend, which is manifest in various intensity in practically all populations living in countries with developed socio-economic systems. Among the main causes of secondary acceleration are improved nutrition, especially an increased intake of vitamins, changes in the way of life, greater contact of children with the sun and fresh air and improved preventive, as well as curative medical care

15.3

920. OAKLEY, A.A.- PLOTKIN, H.C.: Brain, behaviour and evolution.

Journal of Biological Education, 14, 1980, No.1, p. 77.

A review of an important book devoted to an introduction to the study of behaviour with special attention to evolutionary consequences. The first three chapters deal with basic facts such as the elementary theory of evolution and genetics, the theory of the structure and morphology of the nervous system of vertebrates and a study of the behaviour of the brain in relation to evolutionary biology. This introduction clearly distinguishes the approach to the problem by a psychologist and by an ecologist. Further chapters concern such topics as the chemical system of the brain and evolution, the size of the brain and intelligence, the cerebral cortex and adaptive behaviour, consciousness and free will. A chapter on the functions of sleep is of special interest.

15.3

921. OXNARD, C.E.: Human fossils: New views of old bones.

The American Biology Teacher, 41, 1979, No.5, pp. 264-276.
18 figs., 1 tab.

In this article the author deals with new views concerning an understanding of human fossils found in Africa in the vicinity of Sterffonstein, Olduvaie, Kromdraeie and Makapansgatu. These findings are usually considered to be the remnants of Australopithecus, but the author has expressed his doubts and explains them in detail. He first discusses the use of comparative methods which take measurements and analyse various fossile forms; possible errors which can occur are also discussed. He also analyses some statistical methods, such as multivariational statistical analysis and methods for measuring irregular shapes, in this case pelvic bones. Next be describes further methods for determining the characteristics of pelvic bones, for instance the method of measuring the function of the central axis, scanning methods, Fourier analysis, traditional radiography, internal selection, etc. Then he comes back to the problem of assessing bone findings and cites various hypotheses concerning the evolution of man. Finally he sums up his arguments for the use of biology teachers.

15.3

922. SITTON, T.: Hunters, gatherers and human ecology.
The American Biology Teacher, 42, 1980, No.6, pp.345-347.

In this interesting study an anthropologist, historian and ethnograf compares the social, political and religious life of the Eskymo Netsilik tribe and a tribe of bushmen from the Kalahari desert in southeast Africa. He comes to the conclusion that the social life of both ethnic groups is determined and conditioned by hunting and seeking food in various seasons, when individual tribes gather at specific places. The Eskymos gather to hunt seals and then follow the migration of the Caribou raindeer, while the bushmen gather in the period of rainfall, when they are able to gather plants to serve as food and fodder. The bushmen can distinguish over 100 species of plants and almost 200 specie of animals which serve as their food. Seasonal gatherings, which have been repeated for hundreds of years, have given rise to specific and unique cultures, which in both cases concentrate on obtaining food.

15.3

923. SULLIVAN, N.: Cave art: Reflections of early human culture.

The Science Teacher, 48, 1981, No.1, pp.15-18.
3 figs.

A study of early art done by cave people, written by a biologist, shows that the quality of this art is not at all "primitive", but rather documents that early artists, 5 thousand years ago, were able turn their observations into art. The author considers the intellect of these people and refutes some conventions concerning "primitives". Light, colour, imagination, emotions, etc. were the source of inspiration of those people who created the works of art found in Altamira, Lesceaux, Cambrolles and elsewhere. The author expresses the opinion that a great many more similar works of art were created, but only those in caves remained in tact because they were protected against the influence of the climate and other damaging factors.

15.3

924. THIEL-LUDWIG, U.: Tierjunges - Menschenkind. /Young animals and children./

Praxis der Naturwissenschaften, 29, 1980, No.6, pp. 161-172.
6 figs.

The article describes the development of a neonate, until toddler age, from a biological and ethological point of view, on the basis of the findings of medicine and psychology and their practical use. Special stress is placed on the needs of children at an early age and the sequence of these needs. The object of study were children in families and children in educational institutions without parents. The development of children is also compared with the development of young animals of various species. The mental deprivation of children is an important problem; it occurs as the consequence of insufficient contact with the person taking care of a baby. Problems concerning the isolation of children are discussed /complete isolation is very rare/. Also such problems as separation, hospitalism, deprivation of children within the family, the problem of employed mothers, crèches and kindergartens are also discussed. The author stresses the significance of including this topic into the biology syllabus. It should form part of the ethology course, but it has interdisciplinary relations with psychology, pedagogics and sociology.

15.4

925. BAUMEL, H.B.: "Genetic engineering" gains momentum. The Science Teacher, 47, 1980, No.4, pp.33-34.

Laboratory experiments with ribonucleic acid, which had been prohibited in the USA, were allowed to continue in 1980, in view of the pressure exerted by biologists in this direction. Since then "genetic engineering" has progressed rapidly; it concentrates on modifications or the forming of new genes in a test tube. The article discusses some of the details of work with DNA and RNA and the extensive plans which are still in the preparatory stage, such as the "new eugenics", as well as the possibility, in the future, of preventing hereditary disease. It enumerates various uses to which genetic engineering can be put and outlines the intensive research which must still be carried out in DNA techniques before useful outputs can be obtained.

15.4
926. BÖRNER, T.: Neue Vorstellungen über die Struktur der Gene. /New ideas concerning the structure of genes./

Biologie in der Schule, 29, 1980, No.12, pp.497-504.

Genetists until recently thought that the structure of the gene carried genetic information for one protein. Nobody predicted that an eukaryont cell and also a viruse, after transcription and before translation, can be cut from the m-RNA in large pieces and that thus specific genes are not necessary for the coding of protein. The author discusses three essential new findings concerning the structure of genes: 1. Viruses and bacteriophages have a specific DNA which carries sequences of genetic information for more than one polypeptid. 2. The genes of eukaryont organisms and viruses are capable of forming long sequences, which do not carry information for the sequence of aminoacids in peptides, in the middle of a coding sequence of nucleotids. 3. Genes for immunoglobulins are not "ready made" in the organism ahead of time, but are subject to a process of maturity. The first finding concerns above all overlapping genes of viruses and bacteriophages. It was found that genetic information would not be sufficient for the coding of the proteins produced by it and that the mutations in one nucleoid become manifest in two proteins /the sequence of nucleotids of RNA or DNA contains information for 2 proteins/. The author documents this on the example of the virus SV 40. In the second finding we have "interrupted genes" - which are genes with interrupted sections which are not found in the m-RNA. This concerns genes which code proteins, r-RNA and t-RNA. They are found in the nucleus, in chloroplasts and mitochondria and also in viruses of eukaryont cells. They are not found in in bacteriophages and in bacteria. For those sections of genes which do not have a coding function the term "introns" is used, and coding genes are designated as "exons". While both types of genes are transcribed into m-RNA, "introns" are cut out from them. Nevertheless, they are necessary for the normal function of a gene. In conclusion the author deals with the "maturity" of genes which code immunoglobulin. If each immunoglobulin were coded by a single gene, there would have to be a huge number of them. This paradox is explained by the author by the special structure of immunoglobulins /for instance two light ones and two heavy polypeptids/ in which there are constant and variable sections. Genes which are coded are completed only during embryogeny. Their structure is dealt with in detail by the author /they are composed of three segments, among which recombination takes place/.

15.4
927. DOSTÁL, P.: Buňka - doklad jednotného původu organismu. /The cell - proof of the uniform origins of organisms./

Přírodní vědy ve škole, 31, 1979/80, No.9, pp.323-327. 3 figs.

The article sums up the latest findings on the biology of the cell, with special stress on the unity of morphological, physiological and phylogenic aspects, so that the cell is approached as an integrated dynamic and evolving living system which is the basic building and functional unit of all organisms.

15.4
928. DUMAS, G. - NOARS, P.: Quelques métodes classiques d'étude de la cellule. /Some classical methods of studying cells./

Biologie,Géologie, 67, 1980, No.4, pp.919-955. 24 figs.

A broadly based study which aims at clarifying methods used to study cells and their basic functions. In order to facilitate an understanding of this subject-matter the authors also provide basic definitions and the nomenclature used. The methods themselves are described from a morphological and functional point of view. The final part of the article is devoted to microscope photography, which is demonstrated by a number of microphotographs done with an electrone microscope. Also the staining of specimens is described and microscopy techniques in general are discussed.

15.4

929. **ERICKSON, J.:** What is the centromere.

The American Biology Teacher, 41, 1979, No.1, pp.40-43.
3 figs., 1 tab.

The article provides a survey of studies done on the subject of the centromere, which some author call "kinetochor". The author describes the role which the centromere plays in cellular division, beginning with anaphase. He also discusses the opinions and findings of some scholars and compares the approach to the centromere as it is found in various textbooks. The findings of a project to study various textbooks are summed up in a table which stresses general approaches and explains chromosomes, mitosis and meiosis. The object of the article is an attampt to standardize and classify the term centromere or kinetochor in genetics and biology textbooks.

15.4

930. **FISCHER, E.P.:** Klassische und moderne Gene. /Classical and modern genes./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.11, pp.321-334.
7 figs.

The author describes the history of studying genes as units of heredity since ancient times until the present-day study of molecular biology. He describes the contemporary situation in genetics, which has already made it possible to produce insulin by bacteria by inserting genes for the making of insulin into the genetic code of bacteria. The future, however, holds some dangers of misusing the opportunities provided by the technology of gene changes. Already Aristoteles in ancient Greece observed the phenomenon of heredity. In the 19th century R. Mendel studied heredity in peas and formulated the laws of heredity. In 1909 W. Johansen introduced the term gene, which has become a unit of heredity. Staining methods and improved microscopy techniques have shown the site of the gene to be in chromosomes. The further development of genetics has proven the connection between genes and mutations and the gene has also become the unit of mutation. Another hypothesis was formulated: one gene represents one protein. The experiments done by Beadly and Tatum with the Nemospora mold have made it possible to define a gene biochemically as a section of chromosome which is responsible for the synthesis of one protein. Scientists have studied the material of which a gene is formed and thus the classical idea of a gene has been developed. In 1953 Watson and Crick discovered the structure of a DNA molecule and explained how it transmits genetic information. A gene has thus become a DNA molecule. It was also found that genes contain information for their own system and for the forming of DNA proteins, which are formed by four basic building blocks. The transmitters of genetic information are ribonucleic acids. Information in the cell goes from DNA, through RNA to a protein. Soon it was discovered that also the transmission of information in the opposite direction exists - this is the transcription of information from RNA to DNA and from RNA to a protein. In 1961 Jacob and Monod discovered that it is necessary to distinguish structural and regulatory genes; the structural gene contains information for proteins, while the regulation gene is part of a chromosome which controls whether and when the information of the structural gene should be used. The definition according to which a gene is a piece of DNA is not sufficient, because we now know that a gene contains more than one structural molecule of DNA. We now distinguish classical genes /only in bacteria/ and complicated structuralized genes in organisms with a true nucleus /Eukaryont/. The greatest advance in the study of genes occured after the discovery made by Ingram in 1957 which proved that sickel-cell anemia is caused by a changed sequence of amino-acids in a polypeptide chain. Thus it was found that genes are responsible for the synthesis of polypeptide chains. Discoveries made by immunology have proven that each antigen has one antibody /anti-particle/, which prevents the antigen from causing damage. Also genes for antibodies have been discovered and knowledge of the composition of the gene has thus been extended. Between two sections of an exon in a gene there is a so-called intron /intragennous material/; the structure of the exon-intron gene is also now known, as well as the connecting part of the J-Region, which forms a single gene. At present the gene is no longer considered to be a stable, but rather a dynamic unit. The classical understanding of genes has, as a consequence of the discoveries made by immunology concerning antibody genes, been disgarded. The study of genes still continues. Genes for behaviour have also been discovered; for instance the honey bee has genes which control the behaviour of worker bees when fruit begins to decay -they either leave this fruit in the hive or take it away and this characteristic is interited on the basis of Mendel's laws /i.e. hygienic and non-hygienic strains of bees/. The author also provides information on groups of genes, the control of genes, genes as supergens and genes in man /problems connected with the cultural revolution of man/.

15.5

931. HARPER, G.H.: Speciation or irruption: the significance of the Darwin finches.

Journal of Biological Education, 14, 1980, No.2, pp. 99-106.
4 figs.

13 species of Darwin finches /Geospizanae/ live on the Galapagos islands. Their differences and the causes of differences are the subject of a theoretical study based on a study of the behaviour of the finches, the opportunities they have for migration on the islands, their ecology and food.

The author compares them with other specie of birds whose specific characteristics are the result of the fact that they obtain their food from the cones of various conifers. The article also concerns the educational importance of studying alternative theories on the rise of speciation in Darwin finches living in the Galapagos islands.

15.4

932. KATMANN, U.: Fleissgewicht und Homöostase. Zur kybernetischen Beschreibung von Biosystemen. Teil 1. /Dynamic equilibrium and homeostasis. On a cybernetical description of a biosystem. Part 1./

Der mathematische und naturwissenschaftliche Unterricht, 33, 1980, No.4, pp.202-209.
7 figs.

The author describes the regulation and control of open systems and how dynamic equilibrium /a steady state/is achieved on the basis of suitable examples such a flowing water system, the flame of a candle, a living organism and compares this to regulatory phenomena in homeostatic systems. Regulatory phenomena in the exchange of matter and energy in an organism are essentially based on dynamic equilibrium. Diagrams show the control of technical and natural systems. In a study and description of control and self-control of bio-systems a new science has come into being: bio-cybernetics, which can also provide biology instruction with a number of suitable examples. The article also provides an outline of dynamic /steady state/ equilibrium in the open living system of a unicellular photoautotrophic organism. The diagram includes the circulation of matter and energy, photophosphorylation, the photolysis of water, a Calvin cycle, glyoosis and fermentation, a citric acid cycle, oxidative phosphorylation, respiration chains, protein synthesis and the function of enzymes.

15
933. KOMINIKOV, L.P.: Microbiologiya na konserviraneto.
/The microbiology of preservation./
Biologiya i khimiya, 23, 1980, No.5, pp.8-13.

Food products made of plants or livestock can also serve as a cultivating medium for the development of various microorganisms. The preservation of food products has been carried out since time immemorial and various methods can be used. According to Nikitinski they are based on three basic principles: biosis, anabiosis and cenoanabiosis. The author describes a number of various preservation methods based on these principles.

15.4
943. KOSTOVA, Z.B.: Razvitiye na evolyutsionata teoriya.
/The development of evolution theory./
Biologiya i khimiya, 23, 1980, No.3, pp.25-31.

The author describes the basic stages of the development of evolutionary theory in the form of a summary table, where she distinguishes the period before the evolutionary understanding of the world in 1859, Darwinism up to 1942 and the modern period of a synthetic understanding of evolutionary theory after 1942. Another column in the table gives the names of scientists connected with each stage and finally a characteristic of each period. On this basis the author recommends class work assignments for pupils.

15.4
935. LONG, B.W.: The double helix: A bonus for DNA students.

The American Biology Teacher, 41,1979, No.2, pp.112-113, 128.

The author describes his own experiences with giving students the book by J.D. Watson "The Double Helix" as reading material for the biology course. An analysis of the book and a discussion on its content have always formed the concluding class on the subject of DNA and protein synthesis. Besides the topic itself, the book also provides students with an opportunity to become acquainted with the names of outstanding scientists, both in Europe and the United States. The author devotes special attention to Rosalind Franklin. Other stimulating aspects of Watson's book concern the life-style of young scientists and comments on the significance of the Nobel Prize. Besides this the author also acquaints students with various techniques by which DNA was discovered, such as x-ray crytalography and difraction.

15.4
936. LOTHER, R.: Génetic engineering und der Mensch. /Genetic engineering and man./

Biologie in der Schule, 29, 1980, No.2/3, pp.84-85.

New technologies have been developed in the area of molecular biology which are based on so-called genetic engineering, i.e. a complex of methods which make it possible to manipulate genes. The current practical significance of the technique is in the introduction of animal genes into micro-organisms, which then produce, in the form of metabolic products, various enzymes and hormones. The industrial utilization of bacteria which have been thus manipulated is still in its beginnings. However, complex ethical and social problems have developed in this context, especially the possibility of using these methods for military purposes. The VIIth Colloquium on the Philosophical and Ethical Problems of Biology, which was held on November 11th to 14th 1979, discussed these problems. The author describes briefly the various papers presented to the colloquium.

15.4
937. MARKOV, M.: Slnce i biosfera. /The sun and the biosphere./

Biologiya i khimiya, 23, 1980, No.2, pp.28-34.

It is well known that the sun is the foundation for the development of life on our planet. Already the earliest work of scholars from all countries acknowledges the dependency of organisms and life functions on the existence of the sun. In the present century a new science - heliobiology-has been founded by A.L. Chizhkovskiy. The subject of his studies is the influence of the sun on the biosphere. However, also other scientific disciplines participate in this science so that really complex findings can be arrived at. The radiation energy of the sun is the main source of the majority of physical and chemical prowesses in the atmosphere, hydrosphere and lithosphere. The processes and qualitative changes of energy which take place and their reflection in the biosphere are the subject of continued study. We have records of the influence of sun spots on living organisms from as early as the 17th century. It is known that the magnetic pole of the Earth undergoes daily and nightly changes which depend on the daily and nightly rhythm of the sun. Biological rhythms are also dependent on changes of this magnetic pole. The opinion has been expressed that large-scale catastrophies on Earth, the development of epidemics, wars, etc. have their origin in these energy changes. A scientific study of these problems is only in its beginnings, but mankind, on the basis of learning about natural laws can overcome the negative consequences of these factors, while utilizing others to its profit.

15.4
938. MÜLLER, H.: Informations- und Regulationsvorgänge im Organismus. /Information and regulation processes in the organisms./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No.12, pp.374-376.
6 figs.

The article provides information on the mechanism of the impact of some hormones, which influence the transport to and from cellular membranes and thus influence the process of metabolism in the cell. Varied substances which make up transmitters and their method of effecting the nervous system are shown in a diagram. The article deals specifically with acetylcholine, noradrenaline, serotonine, gamma aminobutyric acid, glutamic acid and glycine.

15.4
939. RACLE, F.A.: Introduction to evolution.

Journal of Biological Education, 14, 1980, No.1, p.78.

The subject of the book reviewed here are comments on what is known about the origin of the world and life, the history of the Earth, Darwin's theory of the development of the species, Mendel's genetics, proof of evolution and natural selection, phylogenic divergence and human development. The exposition is somewhat simplified and therefore suitable for students in the lower classes of secondary school. The book contains a number of drawings.

15.4
940. ROBERTS, B.: "Survival of the fittest" - How the phrase has survived.

Journal of Biological Education, 13, 1979, No.1, pp. 9-16.

The article discusses the origin and meaning of the phrase "survival of the fittest". The development of the concept of "the fittest" in a neo-Darwinian sense is discussed, as well as the use of the term in other connotations. The author also considers replacing this term and makes suggections for its correct explanation in the context of the manner in which various textbooks use it. He then discusses the relation which exists betwee the way in which "the fittest" is interpreted and achieving an understanding of various evolutionary mechanims. The author also discusses the use of the term "survival of the fittest" by Herbert Spencer in 1864. Separate chapters are devoted to Darwin's interpetation of the term, and how it is interpretated by Darwin's followers.

15.4
941. SACHS, H.: Biomembranen - Strukturen, Funktionen und Dynamik. /Bio-membranes, their structure, function and development./

Der Biologieunterricht, 16, 1980, No.1, pp.5-41.
2 tabs., 12 figs.

The author devotes this article to biological membranes, their structure, functions and dynamics. On the basis of the most recent findings, we know that cellular systems developed on the basis of recombination from earlier, more simple biotic systems /viruses are not the direct precursors of existing forms of cells/. During the evolution of cells two early biotic systems developed - a reproductive system and a system capable of evolution /an information carrier and a functional carrier/. Genes and enzymes enclosed in a specific reactive area in a microspherical membrane have formed specific reactive environments. In the process of autonomization, not only internal, but also external membrane systems with specific reactive areas have developed. First,however, heterotrophic anaerobic systems were developed and only then autotrophic and heterotrophic aerobic systems. The contemporary cell is composed of three stages, an external stage, a lipophilous stage and a plasmatic stage. The author distinguishes plasmalemma /part of the protoplast of the cell/ and the cell wall /a product of the protoplast/. He also describes biological membranes in general. The endoplasmatic reticulum and nucleus have a single membrane, plastids and mitochondria have 2 membranes. Biological membranes have various functions, for instance they divide into different areas, they mediate the transportation of substances between these areas, the have a regulatory function, and they have a controling function for other units. Diffusion, passive permeability, semi-permeability, selective permeability, active transportation and the problem of transmissions are all connected with biological membranes, as well as various models and methods of transmission, the forming and maintaining of electrical potential, electrical isolation, the transformation of signals and reception. Biological membranes are also carries of specific structures which make cellular contact possible and regulate this contact while increasing the biologically effective surface. The author in conclusion discusses the composition of biological membranes.

15.4

942. SHARP, J.D.: *Symbiosis: Creatures living together in nature.*

The American Biology Teacher, 42, 1980, No.5, pp. 290-292, 304.

The author begins his exposition of symbiosis in the pre-history of the Earth. Competition, animosity, antagonism and parasitism are also forms of symbiosis, as well as predator - prey relations. Symbiosis forms unity in nature, where the death of one specie which lives in symbiosis contributes to maintaining the life of another specie. Symbiosis in nature can be influenced by people through their intelligence; the symbiosis which exists in human society requires improvements.

15.4
943. THOMAS, E.: Das Helix-Modell der DNS - zwischen Experiment und Theorie. /The helix model of DNA - between experiments and theory./

Biologie in der Schule, 29,1980, No.1, pp.38-43. 2 figs.

In the empirical interpretation of scientific cognition the opinion predominates that there exists a more or less direct path from experiments to theoretical generalizations, which in turn lead to new knowledge. This interpretation has its origins in F. Bacon. In reality there is a complex and multifacted relationship between an experiment and theory, which is clarified by the author on the basis of the example of DNA. A clarification of this model is the outcome of international cooperation. The author describes the history of the discovery of DNA /Miescher, Weismann, Kozlov,Griffith, Singer, Caspersson, Chargaff, Pauling, Corey/. An important assumption for forming a DNA model was a study of the content of its base. The DNA model is the outcome of the study of experimental findings and theoretical discussions. The correctness of the model was confirmed by x-ray analysis. At the beginning of the fifties many biologists still devied the importance of DNA for maintaining and reproducting genetic information.

15.4
944. VIGUE, C.L. - STANZIALE, W.G.: Recombinant DNA: History of the contraversy.

The American Biology Teacher, 41, 1979, No.8, pp. 480-483, 491.
3 tabs.

The authors discuss the problems connected with DNA recombination and the techniques used to accomplish recombination. The recombination of DNA develops by combining DNA molecules from 2 different organisms, where the degree of their relatedness is not important. This can lead to cellular metabolic changes, which cannot be anticipated. The social usefulness of forming recombinant DNA can not as yet be assessed or estimated. It could represent a contribution to the development of new drugs, help in improving the fertility of the soil, or serve as a substitute for defective human genes and make their mapping more precise, etc. Far-reaching polemics have been carried on concerning the recombination of DNA, which were begun in 1971 with experiments with the virus SV-40 and recombinant DNA of a lambda phage, and the insertion of the hybrid into the bacteria Escherichia coli, which is part of the bacterial flora found in the human intestine. The article describes in detail the course of the polemics on this subject and describes further experiments with transplantations of various DNA into Escherichia coli.

15.5
945. McCORMACK WILSON, S.- HENDRIX, J. - MERTENS, T.: Teaching about technological death and dying and enthanasia.

The American Biology Teacher, 41, 1979, No.4, pp. 226-229, 233.

Because biology is the science of living organisms and living processes, part of which dying and death are, teachers often find themselves in a situation when they must explain problems connected with enthanasia to their students. The aim of the article is to sum up the factual material and arguments for and against and to make it possible for students to form their own opinions on the subject. Some basic definitions are provided, such as for instance active and passive enthanasia, a normal state, etc. 4 main arguments against enthanasia are cited /the possibility of a faulty diagnosis, the appearance of new drugs, the misuse of insurance policies, and the problem of considered consent/, as well as the three main arguments put forth by those who are for enthanasia /the right of the patient to reject medical intervention, the right to and need for personal dignity and the manner and quality of the remainder of life/.

15.4

946. ZAGÓRSKI, W.: Mechanizm biosyntezy białka. /The mechanism of the bio-synthesis of proteins./

Biologia w szkole, 33, 1980, No.2, pp.67-78.
6 figs.

The article deals with the significance of proteins for living organisms and the mechanism by which the biosynthesis of proteins takes place. Proteins are an irreplacable structural component of the bodies of plants and animals, they are the building material and reserves of living organisms /albumin in the blood, aminoacids, casein in milk which all young animal organisms require/; they are also anti-infection factors /gammaglobulin/, structural forming elements /collagen in connective tissue, in cartilage, bones, in the urinal bladder, in intestine walls, in the liver, muscles; collagen represents 30% of all proteins found in an organism/, they are responsible for the movement of an organism /actin, myosine, ATP/, they are factors in cyto-skeletal formations /micro-tubuli/, they contribute to the transportation of substances in the cell and in the organism /haemoglobin/, they are a component of cellular membranes and cellular organelles, they have a regulatory function in the organism /hormones, insulin/, they regulate genetic expression /as repressors and activators of genes/, they are elements in cellular receptors /the transmission of information to cells/and they have a highly specialized function in the transmission of excitation /the transformation of light impulses into nerve impulses in the eye - rodopsine/.

The author also deals in detail with the structure of cells, genetic information, DNA, RNA, mRNA, the genetic code, the transfere of RNA /tRNA/, the course of the synthetization of polypeptide chains, the success and outlooks for transplantations and interferone /proteins produced by cells infected with viruses which serve to slow down the development of the viruses/, which is very promising for combating viral infection.

15.5

947. COMBES, C.: Controle d´une maladie parasitaire /d´apres l´éxample de la bilharsiase/. /Controlling parasitical disease /on the basis of the example of bilharziasis/./

Biologie,Gōlogie, 67, 1980, No.4, pp.913-918.
4 figs.

The author has chosen bilharziasis as an example of a disease caused by a parasite to discuss how it can be controlled. Approximately 400 million people suffer from this disease which is also sometimes called schistosomosa, and which is very dangerous due to the simplicity with which it spreads. After describing four main types of bilharziasis, the author describes the course of the disease and its individual stages, beginning with the egg of the parasite and ending again with the egg. The article can be of value not only to students of biology, but to all those who intend to travel in the Orient or South America, so as to prevent contagion, on the basis of knowledge.

15.5

948.COTHERN, C.R.: Human interaction with stratospheric ozone.
The American Biology Teacher, 41, 1979, No.7, pp. 402-409.
9 figs.

Technical progress has made it possible to use sprays for a variety of purposes, but they have a negative effect on the atmosphere by destroying the ozone layer found in the stratosphere. The author describes the whole problem and makes suggestions for its use in biology teaching. First some problems must be explained, such as what is ozone and how can a depletion of ozone affect man or other organisms upon which man depends. Then some of these problems are dealt with in greater detail. Ozone is defined as a molecule composed of three oxygen atoms, its characteristics are described /this section is accompanied by drawings explaining the problem/. Another question dealt with by the author is equilibrium in nature, the various layers of the atmosphere, the effect of stratospheric ozone on our environment and how man influences the ozone layer. In conclusion the author offers his own comments on what has been done in this area and what could and should be done.

15.5

949. EISENBLÄTTER, D.: Derzeitige Möglichkeiten der Verhütung von Herz-Kreislauf - Krankenheit.
/Existing possibilities for preventing disease of the heart and circulation system./

Biologie in der Schule, 29, 1980, No.12, pp.534-540.
5 figs.

After infectious diseases have been controlled the importance of chronic disease is increasing; among them, first place is held by heart and circulation diseases. In 1977 in the G.D.R. 39% of all men and 30% of all women who died in the age group between 45 and 64 years, died of heart and circulatory disease. The basis for this diseass is arteriosclerosis and arterial hypertony. Arteriosclerosis can be the cause of a myocardic infarction; risk factors in this context are high blood pressure, smoking, diabetes, being overweight, lack of movement, increased levels of uric acid in the blood, increased levels of fats in the blood and psycho-social factors. Arterial hypertony /high blood pressure/ in the industrially developed countries is the most frequently encountered circulatory disease; 15 to 20% of the adult population suffer from it. The risk factors with this disease are the same as with arteriosclerosis and are analysed in detail in this article.

15.5

950. HALIS, N.A.: Mycotoxins in mould-ripened foods.

The School Science Review, 61, 1980, No.217, pp. 702-707.
1 fig.

In 1960 it was found that fungi which attack food stores may have carcinogenic effects. This finding led to extensive research which also included foods where fungi cultures are used to ripen the food, such as cheese, wines, etc. and also food made in the home, for instance home pickeling, etc. The author deals in detail with the mycotoxins present in these foods and their health hazard qualities. Pictures show the structure of these mycotoxins.

15.5

951. HORNÍK, F.: Několik údajů o rakovině. /Some facts concerning cancer./

Přírodní vědy ve škole, 31, 1979/80, No.1,pp.11-12.
1 tab.

Cigarette smoke is one of the best known carcinogenic substances. Others include asbestos dust, benzol and radioactive radiation. Among physical factors the best known are those with thermal impulses, such as ultra-violet radiation and x-rays. Also oncogenic viruses can cause cancer, which can also be caused by hormonal and immunological disorders. At present the majority of scientists are of the opinion that cancer is the outcome of the simultaneous influence of various exogenous and endogenous factors which include sex, the enzymatic system the person is endowed with, the ability of DNA to overcome disorders, hormonal disorders, etc.

15.5
952. KIEFFER, G.H.: IVF - in vitro fertilization.

The American Biology Teacher, 42, 1980, No.4, pp. 211-218.
3 figs.

The gynecologist Patrick Steptoe and the physiologist Robert Edwards have carried out experiments with artificial insemination on rabbits since 1936. On the basis of this endeavour of many years they have finally been successful in 1978 in artificially fertilizing a woman who otherwise could not conceive. The author of the article describes the methods used in detail and also discusses the risks involved, as well as some of the ethical and legal aspects of the problem. The article is suitable for secondary school students.

15.5
953. KNOX , R.B.: Pollen and allergy.

Journal of Biological Education, 14, 1980, No.1. p.78.

The book reviewed in this article is an excellent introduction to the facinating micro-world of pollens, their role in fertilization, their dissemination and development. The first two chapters deal with the structure of pollen grains and are accompanied by microphotographs made with an electron microscope, as well as with drawings. Other chapters deal with the dissemination of pollen, the mechanism of pollination and with a very interesting discussion of fertilization.

15.5
954. KOLLMANN, A.: Genetische Familienberatung am Beispiel des Down-Syndroms . /The function of genetic family counselling on the basis of the example of Down´s syndrome./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 11, pp.341-349.
2 figs., 3 worksheets.

On the basis of the example of Down´s syndrome /sometimes also refered to as mongolism/ the author demonstrates the methods used by genetic counselling and the problems it deals with. This counselling is especially aimed at people about to be married and those where Down´s syndrome may appear. Down´s syndrome is now very well understood by physicians. It is a genetic disease, which is caused by the presence of 3 chromosomes in 21 pairs of chromosomes found in man. The redundant chromosome can appear freely /a so-called free trisome/ or it can be attached to another chromosomes, in a so-called translocational trisome. Various methods of forecasting the liklihood of Down´s syndrome are known. Using this subject for class work assumes a knowledge of cyto-genetics, knowledge of the notion of chromosomes, their structure and number, a knowledge of meiosis, its normal and pathological course and some knowledge of probability theory. The percentage of incidence of chromosomal disorders increase with the age of the mother.

15.5
955. PODSTOLSKA, M.: Centrum zdrowia dziecka. /A centre for children's health./

Biologia w szkole, 33, 1980, No.1, pp.5-7.
2 figs.

The Centre for Children's Health is a special kind of monument to remind us of the heroism and martyrdom of the 13 million children who died in the course of World War II. Of this number, 2 million were Polish children. The idea for building such a monument, whose purpose it is to safeguard the lives of children and make it possible for them to return to a healthy life when they become ill, came into being in the sixties on the basis of the iniciative of the Council for the Protection of Monuments to Martyrs and Those Who Died in the War of the Polish Peoples' Republic. This body formed a committee, headed by J. Wieczorek, for the building of the monument. The call for funds to help build the monument was received with exceptional understanding, both in Poland and abroad. By 1979 over 1600 million Zlotys and over 10 million dollars has accumulated for the building of the center and after this date another 188 million Zlotys and 5.6 million dollars were received. The cornerstone for the Centre for Children's Health was placed on a 30 hectar piece of land near Warsaw at Miedzylesie, where a total of 13 hospital buildings, 3 out-patient clinics and an administrative building are being built, as well as a hotel for mothers and children and a special rehabilitation department. The first part of the Centre was openned in 1979. It is administered by the Polish Ministry of Public Health and is meant to deal with health care problems of children from their birth until 18 years of age. It has special departments for cardiology, cardio-surgery, nephrology and urology, transplantations, neurology and neuro-surgery and a department for anatomical, metabolic and endocriniological disorders and diseases. Medical students also train at the Centre and it has specialists from all fields of medicine, as well as a total of 70 scientific staff. It cooperates with a number of other institutions.

15.5

956. VOLPE, B.T. - GAZZANIGA, M.S.: Brain and behaviour. The American Biology Teacher, 41, 1979, No.7, pp.431-433.

Cognitive neurology is a new field which uses an interdisciplinary approach to studying the relation between the brain and thinking; it combines the methods used by neurology and psychology. The article describes the development of this new field and some of the problems it deals with. First basic information on the nervous system and the process of memory forming are described. The author distinguishes the so-called short-term memory, which according to latest findings is in fact the active state of the long-term memory. The author also describes clinical experience with older patients which have lost the ability to make a choice and to maintain a specific level of memory. He sums up some of the factors which influence the duration of forming and the stability of the memory as immediate learning. Also the problem of the location of memory centers in the brain and the method of their determination are discussed, as well as studies concerning the molecular basis of memory, which can be explained in the final analysis by the biochemistry of the cell.

15.5
957. WIŚNIEWSKI, L.: Choroby chromosomowe. /Chromosomal disease./

Biologia w szkole, 33, 1980, No.1, pp.7-13.
7 figs.

Chromosomes appear in cells in the mitosis and meiosis stages. Their name was introduced in 1888 by Waldeyer. Chromosomes contain genes which determine the morphological and physiological characteristics of the organism, based on DNA and RNA. In the somatic cells of man a diploid set of chromosomes is found, i.e. 46 chromosomes. They were discovered and described in 1956 by Tjio and Levan. The karyotype of man is composed of 7 groups of chromosomes /A-G/. Metacentrical, submetacentrical and acrocentrical chromosomes are distinguished. All these chromosomes are identical in men and women, but besides them, X and Y chromosomes exist, which are sex chromosomes.

The X chromosome can be included into the C chromosome group, while the Y chromosome can be included into the G group. Numerical abberations /a lack or redundancy of some chromosome/ can appear in human chromosomes, as well as structural abberations. The most frequently found chromosomal change in man is trisomy /the incidence of three in place of two chromosomes in some pair/. For instance Down's syndrome /which appears in one out of 700 births/ which causes so-called mongolism, concerns a change of 21 chromosomes in the G group. This change occurs most frequently in mothers who are older than 35 years old when having a baby. Patan's syndrome is less frequent, it is found in one out of 9000 births and concerns the trisomy of the 13th pair of chromosomes; 50% of these babies die before reaching one month of life. Edward's syndrome concerns the trisomy of the 18th pair of chromosomes. Its frequency is once in 4500 births. Also chromosomal disorders occur in sex chromosomes, as for instance in Kleinfelter's syndrome /karyotype XXY/ and Turner's syndrome /infantilism/. Chromosomal disorders also concern the translocation /the chromosome is found in a different location/, inversion or deletion of some chromosomes or their ring formation, etc.

The diagnosis of chromosomal disorders is now carried out in the 14th to 16th week of pregnancy when a sample of liquor amnii is.taken and the cells in the liquor are studied for their chromosomal composition.

15.6

958. BÖGER, P.: Der Chloroplast als Angriffsort moderner Herbizide. /Chloroplasts as the location where modern herbacides work./

Praxis der Naturwissenschaften-Biologie, 29, 1980, No. 4, pp.106-113.
5 figs.

Combating weeds represents an important contribution to providing for the increasing demands of mankind for more food. Herbacides were first used in the USA in 1941. The first substances used for this purpose were derivatives of ferro-oxyacetic acid, which had an effect on plants much stronger than that of natural plant hormones. At present modern types of herbacides are used, which act on the photosynthetic system of a plant where they act as a brake on the transport of electrons of light energy between photosystems I and II. These substances are mainly active in the light and in this they differ from growth substances which act mainly at night. To study the effects of herbacides, unicellular algae are used which die when herbacides are applied to them in the light, while in a dark environment they continue to grow. Also the selective phototoxicity of weeds and crop plants is being studied. Among modern herbacides the author cites Tribunil, Gesatrop, Dimon, Dicuran and Stomp. Also the influence that these herbacides have on man are the subject of study.

15.6
959. JELÍNEK, F.: Brambory - základní potravina a průmyslová surovina. /Potatoes - food staple and industrial raw material./

Přírodní vědy ve škole, 31, 1979/80, No.6, pp.209-210.

Potatoes bagan to be cultivated in what is now Czechoslovakia probably during the Thirty Year War. But their systematic cultivation began only at the beginning of the 19th century. At present approximately 16 million hectars of leand are cultivated for potatoes worldwide and 229 257 000 tons are produced annually. In 1975 in Czechoslovakia potatoes were cultivated on 251 400 hectars and an average of 15.4 tons per hectar have been produced. 103-106 kilos of patotes are consumed per capita annually in this country.

15.6
960. KOT, S.K.: Osnovi ekonomiki selskokhozyastvennogo proizvodstva. /The foundations of the economics of agricultural production./

Biologiya v shkole, 54, 1980, No.5, pp.7-15.

On the basis of the ideas presented in a letter from the Ministry of Education of the USSR called "Concerning the Further Improvement of Econnomic Education and Teaching of Pupils in General Education Schools" the author here analyses some of the terms and criteria used in assessing the economic efficiency of agricultural production. He also considers the factors needed for increasing this efficiency, such as improving the quality of mechanisation, land reclamation and improvement, increased and improved use of chemicals, the development of specialization and cooperation on the basis of integration and improved cooperation between agriculture and industry, as well as improving the quality of work, cultivating and breeding highly productive strains and breeds of crops and animals, the rational utilization of all productive assets, work reserves, improving the organization of production and work, developing socialist emulation and a Communist attitude towards work, etc. The author also cites various examples and provides data on the outcome achieved by agriculture in recent years.

15.6

961. RÄUBER, H.: Qualitätegemüse durch Vakuumkühlung.
/High quality vegetables through vacuum cooling./
Biologie in der Schule, 29, 1980, No.5, p.222.

As soon as a crop is harvested, the quality of vegetables rapidly deteriorates /for instance lettuce/. Losses are the outcome of transpiration and the withering caused by it - the plants breath so that their temperature rises and then they are easily attacked by micro-organisms. With low temperatures such processes do not occur. Immediately after vegetables have been harvested they can be placed in a vacuum and the then cooled for 15 to 20 minutes to the require temperature /in lettuce this is 1°C/. The fresh quality of the vegetable is then maintained for 12 days. This procedures is suitable for garlic, champignons, asparagus, parsley, as well as for strawberries and freshly cut flowers.

15.6
962. UKHANOVA, O.I.: Mironovskie pshenitsi - gordost otechestvennoy selektsii. /Mironovskaya wheat - the pride of Soviet selection./

Biologiya v shkole, 54, 1980, No.6, pp.7-12.
4 figs.

A historical survey is provided concerning the activities of the Mironovskaya Crop Selection Station, where under the supervision of academician Vasiliy Nikolayevich Remeslo several new strains of Mironovskaya wheat have been produced. The aim of the staff of the Station at present is to cultivate new strains with even better qualities, which would produce up to 9 tons per hectar of grain, be highly resistent to frost, have an increased protein content /15-16%/ and a high quality gluten content. Also new strains of spring wheat are cultivated at the station.

15.7
963. ILYINA, Y.D.: Pushnoye zverovodstvo. /Breeding fur animals./

Biologiya v shkole, 54, 1980, No.2, pp.20-24.

The industrial breeding of fur animals began when the Pushkin State Farm was organised near Moscow in

1928. After 50 years the situation is such that while the hunting of wild fur animals provides annually approximately 1 million skins, breeding has provided over 12 million skins annually. Of this figure, 50% are produced in the Russian Federation, 15% in specialized state farms in the Ukranian Soviet Republic, White Russia and the Baltic countries, 6% are produced by cooperative farms and around 30% by consumer cooperatives. The state farms breed an average of 15-18000 females who produce 60-800 000 young animals annually. The animals are kept in small cages. The technology of breeding depends on the seasonal reproduction of predators - litters are born between March and May and already by autumn they have good quality fur; after skinning, the skins are treated. With the exception of nutria, these animals require large qualitities of meat for food and are usually give scrap from the meat packing and fish processing industries, as well as skimmed milk, silk worm pupa, etc. The price a skin brings depends to a great extent on its colour and this in turn depends usually on genetic mutations /for instance in mink there are 21 recessive and 9 dominant mutations/, so that is necessary to carry out suitable cross-breeding to achieve new combinations of colours.

15.7

964. KOSSOV, Y.G.: Prudovoye rybovodstvo. /Breeding fishes in fish ponds./

Biologiya v shkole, 54, 1980, No.5, pp.16-21.

A resolution of the Central Committee of the Communist Party of the Soviet Union and the Council of Ministers of the USSR from 1978 called "On Measures Aimed at the Further Development of Fish Breeding and Increasing the Fish Catch in Fresh Water Reservoirs" sets the task of increasing by 1985 the total production of fish by more than three times in comparison to 1979, to 504 000 tons annually. In the northern regions natural productivity achieves 125 - 175 kg per hectar of fish pond and in southern areas 300-500 kilo per hectar. The feeding of the fish has an important role to play in improving productivity; for instance an optimum carp diet should be a mixture of forage cake, sunflower scrap, cotton seed scrap, soya beans, etc. /40%/, the remnants of linen seed, mustard seed, etc. /10%/, scrap from leguminous plants /10%/, cereals /24%/, bran, yeast and fish meal. In this way total productivity can be increased to 1-5 000 kg per hectar and more. The specie composition of fish in a reservoir is also very important. The best combination is to breed carp together with the Grass carp /Ctenopharyngodon idella/ and the Pathead /Hypopthalmichthys molitrix/. When these three fish are bred together the natural fodder provided by a fish pond is best utilized and no food competition takes place, since carps predominantly eat Benthos organisms, the grass carp eats plankton and algae, and the Pathead eats zooplankton. Usually a two-year cycle is used in breeding fish - a carp usually weighs 30 g in September of the first year and one year later already 500 g.

15.8
965. AVRAMOVA, E.: I zemyata razhda bogeve. /The Earth also produces gods./

Biologiya i khimiya, 23, 1980, No.1,pp.61-62.

The article is a study of the life and work of Leonardo da Vinci, who is presented to the reader as an artist, philosopher, scientist and technician, but above all as a progressive thinker, who attempted to understand man and to picture him in all aspects.

15.8
966. BERRA, T.M.: Charles Darwin: What else did he write ?

The American Biology Teacher, 42, 1980, No.8, pp. 489-492.
5 figs.

Darwin, as is well known, was one of the greatest natural scientists who ever lived. All students know about his book On the Origin of the Species, which was first published in 1859. This book is the most important single work in the history of biology. Students, however, know less about the fact that Darwin wrote another 17 books on zoology, botany, geology, etc. The author here provides a complete bibliography with brief comments on each book. To this is added a recent bibliography of books about Darwin. The whole paper was prepared in collaboration with professors at the University of Ohio and at Tulane University.

15.8

967. Fundament otechestvennoy nauki. /The foundations of Soviet science - at the occasion of the 225th anniversary of the founding of the Moscow Lomonosov State University./

Biologiya v shkole, 54, 1980, No.2, pp.18-19.

The Moscow State University was founded in 1755 according to plans made by the Russian scientist M.V. Lomonosov. Since its early years it has become a centre of scientific and educational activities in Russia. Among those who studied there are for instance A.N. Radishchev and future members of the Dekabrist movement, writers D.I. Fonvizin. V.A. Zhukovskiy, A.S. Griboyedov, M.Y. Lermontov, A.A. Fet, F.I. Tyutchev, A.N. Ostrovskiy, A.P. Chekhov, K.D. Ushinskiy and the revolutionary democrate V.G. Belinskiy, A.I.Gertsen etc. Also the names of the following biologist should be mentioned: K.F. Rulye, M.A. Menzbir, K.A. Timiryazev and I.M. Sechenov. Among the most famous physicians who studied here are M.Y. Mudrov, N.I. Pigorov, S.P. Botkin and N.F. Filatov, as well as chemists V.V. Markovnikov, N.D. Zelinskiy and V.I. Vernadskiy, physicists A.G. Stoletov, P.N. Lebedev, etc. The democrptic traditions of the Moscow University continued to develop after the victory of the Great October Socialist Revolution, when they became the foundation of all scientific and educational endeavours. At present annually 5000 new graduates leave the university while 8000 people come there to improve their qualification. The university has 17 faculties, 2 teaching and 4 scientific research institutes, 280 departments and more than 300 classrooms and laboratories. Teaching and research are done by 126 academicians and corresponding members of the Academy, by more than 1000 professors and doctors of science and by more than 4500 candidates of science. The teaching and educational work of the university is closely envolved with scientific research and the national economy - annually more than 300 works of scientific research are passed on for practical implementation.

15.8

968. GAWROŃSKI, M.: Wiesław Janiszewski /1910-1979/.
Biologia w szkole, 33, 1980, No.2, p.126.

On December 9th, 1979 prof. W. Janiszewski, an outstanding expert on the subject of the water economy and president of the Nature Conservation League in Poland, died. The article commemorates his work which was devoted throughout his life to problems of the water economy. This work led him to the idea of conserving Poland's waterways and to work in the Nature Conservation League. Since 1963 he was the chief inspector of all Polish waters and a member of various institutions with a bearing on these problems. In this capacity he greatly contributed not only to the prevention of water pollution but also air pollution.

15.8

969. HOMOLA, J.: Jean Babtiste Lamarck - 150 let od úmrtí. /J.B. Lamarck - 150 years since his death./

Přírodní vedy ve škole, 31, 1979/80, No.3, pp.92-94. 1 fig.

In 1979 one and a half centuries passed since the death of the outstanding French natural scientist Jean Babtiste Lamarck. The article deals with his life and work and describes the contribution he made to the development of biology at the end of the 18th and beginning of the 19th century.

15.8

970. HOUFEK, J. - ROUBAL, A.: Vzpomínka na doc. RNDr. Jindřicha Roubala. /In memory of prof. Dr. Jindřich Roubal./

Přírodní védy ve škole, 31, 1979/80, No.5, pp.169-170. 1 photo.

Prof. Roubal died at the age of 77 on July 29th 1976. He was for many years a secondary school teacher in Chotěboř, Louny and Prague and later became a teacher at the State Teaching Institute at Soběslav. Since 1950 he was on the staff of the Pedagogical Faculty in Prague and from 1955 until his retirement at the Pedagogical Faculty in Plzeň.

During the thirties he wrote textbooks on inorganic, theoretical and special chemistry and other textbooks and teaching manuals. A number of publications also concern his long-term study of

Desmidiaceae algae. He was also the co-author of botany textbooks for basic school and general education secondary school, as well as co-author of a zoology textbook for basic school.

15.8

971. YELAGIN, I.N.: Vsesoyuznoy akademii selskokhozyastvennikh nauk im. V.I. Lenina - 50 let. /50 years of the V.I.Lenin All-Union Academy of Agricultural Sciences./ Biologiya v shkole, 54, 1980, No.2, pp.15-18.

In pre-revolutionary Russia the network of agricultural scientific research institutions was small /only 44 experimental stations and 170 experimental fields/. On the basis of the iniciative of V.I.Lenin, the Council of Peoples' Commissars of the Russian Federation on May 21st 1918 dealt with the problem of openning a Russian Agricultural Institute as the first step towards the organization of agricultural science. The complex situation which existed during the early years of the Soviet state caused the actual founding of the Academy of Agricultural Sciences to be postponed until June 1929. The first president of this academy was N.I. Vavilov. The basic objective of its work was to concentrate original research in the direction dictated by the pressing needs of agriculture and to seek new roads of uniting work done at the regional and/or republican level. During the following 50 years a number of academicians have contributed to the advances made by agricultural science, including V.P. Viliyams, D.N. Pryanishnikov, N.I. Vavilov, V.P. Goryachkin, P.P.

Lukyanenko, V.S. Pustovoy, P.N. Konstantinov, P.I. Lisitsin, M.F. Ivanov , A.D. Mazlamov, I.I. Skryabin and A.N. Kostyakov. Today the academy has 127 scientific institutes, 417 experimental stations, with a total area of 2774 000 hectars of land. For the future the academy aims at seeking new and more efficient ways of utilizing the biological characteristics of plants, seeking more productive varieties and hybrids, especially in relation to immunity, resistence to frost, resistance to dry periods, etc. Special attention will also be devoted to increasing fodder production with a high protein content and to increasing the efficiency of livestock production, improving methods of land reclamation, irrigation, feritlization and the use of chemicals. Also the mechanisation, specialisation and concentration of agriculture will recieve attention.

15.8

972. KADIYEV, I.F.: *S prizvaniyeto na uchitel i s prestizha na nauchen rabotnik. 20 godini ot smrta na Shchiliyan Zhelev.* /A teacher by profession and a scientist by calling. 20 years since the death of S. Zhelev./

Biologiya i khimiya, 23, 1980, No.1,pp.57-58.

S. Zhelev was born in the village Yeser in the Sliven district in a poor family. He completed his secondary education at Stara Zabora. He became a teacher and later went on to study the history of the natural sciences at the University in Sofia. As a student he began to specialize in the geology and paleontology of Bulgaria. From 1929 until 1948 he was a teacher at the general education secondary school in Pleven where he at the same time undertook intensive scientific work and published a number of studies. After his death, 6 extensive papers on geology were published.

15.8
973. PEYKOV, S.: Da Vinci - botanik. /Da Vinci as a botanist./

Biologiya i khimiya, 23, 1980, No.1,pp.62-63.

Leonardo da Vinci began his study of botany in early youth, when he drew plants on the basis of observations. His interest in plants went to the extent of drawing up the characteristics of various genera and he was able to carry out some corrections in the system of classification used at the time. He was also interested in the physiology and evolution of plants. Later he applied his knowledge of botany to medicine, gardening and the industrial utilization of plants. In the author's opinion, in order to understand the work of the great artist, also this aspect of his activities should be known.

15.8

974. PODSTOLSKA, M.: Dobre wzorce. /A good example./

Biologia w szkole, 33, 1980, No.2, pp.120-121.
1 photo.

The teacher Irena Mochowa has published teaching manuals for hygiene teaching in secondary schools and is well known as an excellent teacher and organizer of various school activities. In this interview with her, she describes the activities of her pupils, which she has helped to organize, which include planting trees in cities and in the vicinity of schools, as well as various activities done within the framework of the the Nature Conservation League. I. Mochovska has also organized a psychological counselling service for her pupils, to supplement hygiene teaching. I. Mochowska has recieved a number of awards and medals.

15.8

975. TROLL, R.: Johann Wolfgang von Goethe: Poet and scientist.

The American Biology Teacher, 42, 1980, No.1, pp. 55-57 and 60.

A brief essay on the multifarious nature of Goethe's genius, this time from the point of view of his work as a natural scientis. The author stresses the relationship between his study of anatomy, his laboratory experiments and especially his ecological experiments which are so similar to modern methods of field work. He openned up a new world to his generation by his study of nature and his scientific work remains a unique source of inspiration.

15.8

976. V.I.Lenin i obrazovaniyeto. /V.I. Lenin and education./ Biologia i khimiya, 23, 1980, No.2, pp.1-4.

In April 1980 we shall commemorate the 110th anniversary of the birth of V.I.Lenin. At this occasion it is fitting to remember the merits of this great implementor of the ideas of Marx and Engels in the development of a socialist educational system. Already at the beginning of the century Lenin pointed out that it will not be possible to build a new society until education is combined with work in industry. On the eve of the Great October Socialist Revolution, in documents concerning the programme of the Bolshevik Party, Lenin formulated the requirement of free, general, polytechnical education for all children until the age of 16. He also placed great stress on education towards a Communist morality. In Bulgaria and the other socialist countries its is only now that we are able to fully grasp the progressive ideas of V.I.Lenin in relation to the education of the young generation. In many of his writings we are able to find these ideas, which especially young teachers should become familiar with, for their future work.

15.8

977. **WAGNER, G.:** Zum 75. Geburtstag von Karl Kellner. /At the occasion of the 75th birthday of Karl Kellner./

Biologie in der Schule, 29, 1980, No.5, pp.221-222.

On March 5th 1980 the botanist Karl Kellner celebrated his 75th birthday. He is well known for his work in systematics, and especially in dendrology. He is a member of many years of the Society of German Florists at the Martin Luther University in Halle. Among his most important works is the classification of woody species in the Hohenrode Park which serves for teaching. For 20 years he has been collaborating with the authors of the botanical dictionary "The Names of Plants and Botanical Terms".

15.9

978. JASIŃSKI, A.: Instytut zoologii uniwersvtetu Jagiellońskiego - tradycje i wspólczesność. /The Zoological Institute of the Jagiellonian University - tradition and the present./

Biologia w szkole, 33, 1980, No.1, pp.55-59.

The Zoological Institute of the Jagiellonian University in Cracow has a staff of 63 scientific workers /9 professors, 10 associate professors/. It has the following departments: comparative anatomy, anthropology, physiology, genetics and Darwinism, neuro-anatomy, zoological systematics and zoogeography. The Institute has a zoological museum, a microscopy centre and a biology laboratory. The hydro-biological department and the department of zoological ecology, psychology and ethology have been transfered recently to the Institute for the Study of the Biological Environment. The author describes in detail the history of the Zoological Institute and the work of its various departments. Its museum has a total of 4000 items.

15.9

979. MOYER, W.A.: The executive director - the early months.

The American Biology Teacher, 41, 1979, No.7, pp. 396-398.

The author of the article was elected executive director of the National Association of Biology Teachers and in this article he discusses his experiences in the early months of this work. He places special stress on the planning of activities of the National Association, and describes a meeting of the Association held in Reston, where a paper on the future activities of the Association was presented. The aim of the Association is to facilitate the professional development of its members, to further national objectives and to collaborate with other similar organizations.

15.9

980. ZIELIŃSKA, B.: *Instytut zoologii PAN w 60 lecie instnienia.* /The Zoological Institut of the Polish Academy of Sciences - 60 years since its founding./ Biologia w szkole, 33, 1980, No.2, pp.116-118.

In October 1979 the Scientific Council of the Zoological Institute of the Polish Academy of Sciences celebrated the 60th anniversary of its founding. The author provides information concerning the Institute and its history. It has departments which deal with morphology and systematics of animals, zoocenology and ornithology. It has a library of 200 000 volumes and is the centre for faunological documentation. The Institute publishes monographs concerning the fauna of Poland and keys for the identification of animals. It has the largest zoology collection in Poland. Its collections also include specimens gathered during Polish scientific expeditions to Africa, Siberia, Eastern Asia and America.

Summary

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